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TORQUAY

IN

ITS MEDICAL ASPECT

AS

A RESORT FOR PULMONARY INVALIDS.

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BY

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TO

MISS GORE,

WILCOTT MANOR, MARLBOROUGH,

FOUNDER OF THE TORQUAY HOSPITAL OF CONSUMPTION;

This little Work,

WRITTEN AT HER SUGGESTION,

IS VERY

RESPECTFULLY INSCRIBED.

ERRATA.

The reader is requested to correct the following errors :

age 36, line 19, *for* " no" *read* " not."

,, 77, line 15, *instead of* " The human machine is self-repairing," *read* " The divine machine," &c.

,, 113, line 27, *instead of* " so saturated with moisture that it still contains sufficient humidity," *read* " so saturated with moisture that, when we increase the temperature, the air still contains sufficient humidity."

,, 125, line 16, *for* " mean *animal* temperature," *read* " mean *annual* temperature."

,, 133, line 12, *for* " more moisture," *read* " less moisture."

,, 100. The blanks in the table of extremes of temperature should be filled up as follows :

Macclesfield : Nov. 27th, 40°, 34°.

Nottingham : Dec. 3d, 32°, 16°; Dec. 4th, 32°, 12°; Dec. 5th, 52°, 23°; Dec. 6th, 59°, 45°; Dec. 7th, 60°, 54°; Dec. 8th, 59°, 53°.

Chiswick : Dec. 5th, 55°, 40°; Dec. 6th, 57°, 51°; Dec. 7th, 60°, 53°; Dec. 8th, 59°, 51°.

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TORQUAY
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CHAPTER I.

PRELIMINARY REMARKS.

This little work is not intended to be a complete essay on the climate of Torquay. Its aim is far more limited. In most works on local climate there will be found a chapter devoted to the consideration of the influence of the given locality upon disease. It is chiefly that medical chapter on the climate of Torquay, which I here attempt to write; and of that, scarcely more than the portion which relates to Pulmonary Disease.

In carrying out my design, I shall depart somewhat from the ordinary course. The method usually adopted is—after giving a geographical sketch of the locality, and referring to its geology and natural history—to furnish as extensive a series as may be of meteorological observations, having regard more especially to the average temperature and moisture. From these data, inferences are then drawn as to what the influence of the place upon invalids *ought* to be; and, last of all, are presented observations from experience of what the influence of the place upon disease *actually is.*

Such a method is not to be despised. For a new and comparatively little-known locality, in the absence of positive information, it is indeed the only plan by which we can be guided in forming any estimate of sanitary relations. But it is open to the objections which lie against all *à priori* reasoning when put in comparison with the results of direct observation. And in respect to the effects of climate upon the human body more particularly, conclusions so obtained are not likely to prove trustworthy—partly because we are at present far from being acquainted with all the conditions which combine to constitute climate; and partly, too, because such observations as we do possess are stated for the most part in the form of averages.

Now, two places which return very much the same average figures in meteorological tables are sometimes found to be not at all similar in their influence upon the human constitution. And this could scarcely be otherwise, when we consider that it is the climatic character of the place from hour to hour, rather than the average kind of climate for lengthened periods, which chiefly concerns the invalid. The mean (or average) annual temperature of Upper Canada (at Toronto) is only about two degrees colder than that of Nottingham; the hotter summer in Canada counterbalancing the colder winter so far as the statistics of climate are concerned, but by no means as regards delicate lungs. Suppose two places distant from each other, in each of which the mean temperature for any given twenty-four hours should be 50° F. In the one, the heat might rise to 70° and drop to 30° during that period; whilst, in the other, it might rise no higher than 55° and drop no lower than 45°. The mean—that is, the average—temperature for the entire day and night would be the same for both places; but how different the effect upon a pulmonary invalid!

Such tables as are now in general use furnish, it is true, when published in full detail, a statement of the diurnal extremes of temperature; but those lesser fluctuations on which the suitability of a climate for invalids so largely depends can scarcely be adequately represented.

Assuming, however, that all obtainable minutiæ were noted and calculated, even then we should be unable to ascertain before hand what an untried climate would prove in its effects on man. We have no convenient method, at present, generally available for measuring the electrical states of the air; we have much to learn respecting ozone; and there may be conditions yet unknown which tend to modify the lesser peculiarities of climate. For these reasons, whilst viewing meteorological statistics as most important aids in forming our judgment of climate in respect to its general character, we cannot accept them as all-sufficient for deciding on the suitableness or otherwise of a specific place for a specific class of invalids.

It seems, then, to be a preferable plan, where it can be carried out, to note in the first instance the effects of a residence at the place in question upon different diseases and constitutions; and, having obtained our facts with as much correctness as possible, to proceed subsequently to inquire whether or not there be sufficient in such climatic influences as are capable of being tabulated to explain them.

An obvious objection to this will occur to those who value no opinions but such as are founded upon figures, in the scope which it allows for errors of judgment on the part of the observer.

The plan *is* open to this objection no doubt; and, therefore, all that follows is put forth as representing merely the opinions of the writer;

as conveying, in short, precisely that amount and kind of information which might, and, to some extent, constantly has to be communicated to any intelligent non-medical person who is interested in the subject.

There is another particular in which I shall depart from a method too commonly adopted; that, namely, of drawing a comparison between the place discussed and all other localities possessing a somewhat similar reputation;—a comparison which, it need scarcely be remarked, is apt to lead the observers in different localities to very different conclusions; very generally, indeed, to lead the author in each instance to his own conclusion. I am not without personal experience of the other places in Great Britain and elsewhere, which are celebrated for mildness of climate; and very naturally not without a prepossession in favour of Torquay. But it is no part of my present purpose to attempt to elevate Torquay by depreciating other places. My object is to show, in a medical point of view, what Torquay *is*, not to assert what other places *are not*. And I cannot but think that if we had mere truthful representations of the sanitary characteristics of different localities,* any comparative inferences might judiciously be left to declare themselves as experience more and more firmly established the individual advantages and disadvantages of each.

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* This object is now being well carried out in Dr. Richardson's admirable 'Quarterly Journal of Health;' a

Before proceeding, I ought to mention three excellent works in connection with my subject, which I duly read at the time of publication, but have avoided consulting now, from a desire to present here only the results of my own experience. These works are—Dr. Shapter on the 'Climate of the South of Devon;' Dr. Madden's chapter on the Climate of Torquay, appended to his book entitled 'Thoughts on Pulmonary Consumption;' and the admirable pamphlet, published in 1846, by Mr. Vivian, which has furnished all other writers with their meteorological statistics, on the 'Climate of Torquay.'*

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book in every way worthy of perusal by the public as well as by the profession.

* The extent of my obligations to Mr. Vivian's daily meteorological observations, as published in the 'Torquay Directory' every week, will appear in the chapter on the Meteorology of Torquay.

CHAPTER II.

EFFECTS OF TORQUAY UPON INVALIDS.

When a consumptive invalid, who has suffered from hurried breathing, hot cheeks and hands, and restless wakefulness at night, has been at Torquay for two or three days, he usually finds that his breathing is easier, his restlessness less, and his skin softer and cooler in the evening. He sleeps at night, and in place of his customary restless excitability he experiences a gentle languor throughout the day. If he had suffered from night-perspirations, these gradually diminish or cease. At the Consumption Hospital here, the question is often answered thus: "I used to have perspirations every night, but I have scarcely had any since coming to Torquay." The cough becomes softer and less frequent, and is not now excited as previously it may have been by taking in a deep breath. In fact, the patient is more particularly struck by two things,—the greater ease with which he can fill his chest with air, and a certain approach to sleepiness which he had not used to experience. So much the invalid usually notices for himself. His physician observes, in addition, that the pulse becomes slower and less thready; the respirations more ample and less frequent; the tongue soft, moist, and, if red before, less red. Thirst, if previously present, subsides; the peculiar gleaming brightness of eye becomes less striking; and the carmine patch on the cheek less defined and brilliant. The appetite improves, but the feeling of debility at first does not. It is very common for a new-comer to say, "I do not know how it is; I eat better, and sleep better, and cough less, and yet I feel no stronger! Indeed, of the two, I feel less energy than before I came to Torquay." After a time, however, as the soothing influence of the climate continues to exert its beneficial power over the lungs, the patient grows stouter and begins to feel his strength augment. He grows stronger without that morbid excitability which he formerly experienced, and called energy;—energy for the moment it certainly was, but energy without any power of endurance. On first coming to Torquay the bowels act with regularity; in some few persons they have a tendency to act rather oftener than is habitual, but not to the extent of diarrhœa. In a week or two, very generally, the bowels become sluggish, the appetite flags, the invalid feels a certain amount of malaise, and says he is "bilious." He feels suddenly very weak, and, as he not uncommonly remarks, "as if his knees did not belong to him." His tongue is now rather flabby, moist, and slightly coated with white. This state of matters, which depends upon defective excretion from the liver and the intestinal mucous membrane, is truly enough what is conventionally understood by the term "biliousness." The medical attendant finds no difficulty in removing it; and the patient is surprised at his increased feeling of strength and lightness of spirits after the load which temporarily oppressed him has been removed. This "biliousness" has no tendency, like the "bilious attack" of August and September, so common everywhere, has, to cure itself by a spontaneous attack of diarrhœa. On the contrary, if neglected, the bowels are apt to be confined, the whites of the eyes become muddy and yellowish, and, in persons who are not consumptive, jaundice may arise. I do not remember to have ever seen a patient, in whom consumption was advancing, become completely jaundiced.

Perhaps I could in no way more readily convey to a stranger a correct idea of the effect of coming to Torquay, upon a pulmonary invalid, than by repeating the words of an intelligent gentleman who called upon me this morning (November 18th, 1856). "I wish you," said he, "to see my lady, but, in the meantime, I will give you a little history of her case. Two years since, after making some unusual exertion, she broke a blood-vessel in the lungs and lost a good deal of blood. She recovered from this, but, in the same year, had pleurisy. This September she spent at my shooting-box in Scotland. The season was wet and cold. She again broke a blood-vessel in the chest and was very ill. She is twenty-six; has had two children, and is of good constitution. She consulted Dr. Simpson, at Edinburgh, and several physicians in London. We have been down here for ten days, and she is certainly better. Her cough is softer, and not so constant. She sleeps better. In London her breathing was twenty-eight times in a minute, and her pulse 120. Here her breathing is often not more than eighteen times in a minute, and her pulse not above 80 in the morning. She has less flushing in the evening, less perspiration in the night; and her appetite was decidedly improved until the last day or two, but now she seems to be a little bilious, and that is the reason I want you to see her."

From one of his medical friends this lady's husband had learned to notice for himself the frequency of the respirations and of the pulse.

It is always a relief to the patient to know that this little "biliousness" is a sign that the climate is exercising a sedative influence upon his system, which is very salutary to his lungs, although leading to a little temporary indisposition in a new form.

The account given above, in the very words of a non-medical observer, without a single leading question, presents an accurate epitome of the effect of the climate of Torquay upon delicate lungs. There had been no change of treatment whatever. The only change was change of place from London to Torquay in the month of November.

An invalid who is recovering from an attack of inflammation of the lungs, or from severe pleurisy without tubercles, experiences very similar effects from Torquay to those above stated. A gradual lessening of evening feverishness, and increased freedom of breathing, are amongst the earliest signs of benefit.

In the sensitive condition of the respiratory organs which is left by an attack of bronchitis, and in cases of chronic bronchitis, the climate of Torquay is remarkably serviceable. In those protracted cases in which more or less of dilatation of the bronchial tubes has arisen, attended with morning expectoration, and with many of the symptoms of consumption but without the presence of tubercles, on coming here the pulmonary irritation abates by degrees, and the general health correspondingly improves.

An asthmatic invalid, meaning by this a person affected with the pure spasmodic form, is either exactly suited by Torquay or not at all. The trial is the only test. Another form of so-called asthma, which depends upon an emphysematous state of the lungs (that is, ruptured air-cells—the disease which, in horses, constitutes "broken wind"), in which the difficulty of breathing to some extent is permanent, is relieved by Torquay in proportion to the relief afforded by the climate to the bronchial irritation, which, to a greater or less extent, habitually accompanies this disease.

In most forms of affection of the heart, a residence at Torquay is conducive to comfort, and to the avoidance of those mischances to which a patient thus afflicted is peculiarly liable. In some instances, however, it proves unsuitable. The distinction is not difficult to make beforehand. When the patient suffers from over-impulse of the heart and difficulty of breathing on slight exertion, and a sense of obstructive oppression in the chest, particularly if the complexion be florid, and the skin harsh and dry, Torquay will agree. But when the patient is pallid and flabby; frequently faintish, and always feeble; the skin soft, cool, and often moist with cool perspiration;

when, in short, the heart is constantly too weak, without any active irritation existing in the lungs, and with a low state of the general vital power, as a rule, Torquay will not agree.

In chronic affections of the digestive mucous membrane, Torquay proves either exceedingly beneficial, or quite the reverse, according to the nature of the case. It is not unusual to hear one person say, "Speak of Torquay producing indigestion! why living here has completely cured me of indigestion;" whilst another complains that his appetite is keener anywhere else than at Torquay.

When the tongue is too red, inclined to dryness on first waking, with some amount of thirst, a sense of sinking when the stomach is empty, and of uneasiness after taking food, occasional nausea and headache, we have a form of indigestion which Torquay will generally cure. The tongue gradually loses its extra redness, becomes moister and more healthy-looking; the patient is no longer disabled from exertion of both mind and body by a moderate dinner, and the multitude of symptoms which are sympathetic with an over-irritable stomach gradually disappear. Delicate children suffering from that irritable condition of the mucous membrane of the digestive organs which occasions what is called infantile remittent fever (frequently mistaken by nursery attendants for vermination), derive great advantage from this climate. Such cutaneous eruptions about the face as depend upon a state of chronic irritation of the stomach also improve here.

On the other hand, pure atonic dyspepsia is made worse by residence in most parts of Torquay, unless during the accidental prevalence of the north wind. When the patient is habitually pale and flabby, the tongue large, moist, pale, and indented on the sides by the teeth, the skin cold and damp, the lining of the lower eyelids pale, the pulse slow, feeble, and arrested by very slight pressure, the muscular and mental energy small, and the symptoms of indigestion rather those which proceed from habitual flatulent distension than from periodical pain; when the patient is much relieved by such stimulants as port wine, cayenne pepper, &c.; *provided this state of indisposition be not connected with obstructed circulation from disease of the lungs;* with such a form of indigestion Torquay does not agree.

Persons who have resided in India for a few years only are generally very well suited by this climate. And some who have spent the greater part of their lives in hot climates, also select Torquay, with advantage, as their winter residence. A few, however, in whom the enlarged and torpid liver seems to refuse its work, find, if they try it, that Torquay does not suit them. They lose their appetite, become thinner, yellower, and miserable in their feelings; and they improve after leaving Torquay. These cases are exceptional, but so marked when they do occur, that I have no hesitation in deciding that this place is positively injurious to them.

Neuralgia, when it depends upon chronic irritation of some mucous surface, is benefited by Torquay. When, on the other hand, it is the relic of former malarial agency, this climate appears sometimes to awaken the old susceptibility of the faulty nerve. The attacks, however, are scarcely, perhaps, so intensely severe as we see them to be elsewhere.

Periodical nervous headache, when not kept up by gastric or other active form of irritation, is not benefited by Torquay. The same may be said of hypochondriasis when it occurs in persons of languid circulation.

Pure rheumatism, whether acute or chronic, is benefited by Torquay.

Gout, when it occurs in a person of sanguine temperament, with an active habit of body and mind, is suited by this climate. The atonic forms of chronic gout, and of rheumatic gout, occurring in persons of feeble habit, deficient energy of the digestive organs, and languid circulation, are not.

Uncomplicated affections of the liver, affections far more rare than is generally supposed, are not suited by Torquay.

There are certain forms of functional derangement for which a residence here proves very advantageous; and this is frequently one of the great advantages of the climate for females in the earlier stages of pulmonary consumption.* Alluding to cases of functional suspension, Dr. West observes, "In cases where general debility characterises the patient's condition, tonics in the widest sense of the term are indicated; and by them I understand not merely tonic medicines or preparations of iron, though they will almost always be appropriate, but the tonic influence of pure air, healthful pursuits, and exercise short of fatigue. In these cases, too, the one great danger to watch against, is that of the supervention of phthisis; and a winter's residence at Torquay or Ventnor is useful in many instances, not only as a means of guarding the delicate lungs from the cold of many inland places, but also because the warm climate and the sea-air appear of themselves to have a beneficial influence in favouring the healthy development of the reproductive system."*

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* See Burslem on 'Consumption.'

From this brief sketch of the effect of the climate of Torquay upon several forms of disease, it will be inferred that the modes in which it exerts its influence are due to its power of soothing the organs of respiration, circulation, and the nervous system. Its tendency is, to allay irritation of all the mucous membranes, to lessen inflammatory action in general, and consequently to relieve all the feverishness which is dependent on local inflammation; to promote a gentle action of the skin; to render the pulse slower and fuller; and to favour sleep.

A town of 14,000 inhabitants cannot be expected to be exempt from any of the ordinary diseases; but a special climate usually stamps its impress upon each disease as it occurs. This is the case at Torquay. Acute inflammations of any kind are rare. The common diseases of children, such as hooping-cough and measles, are usually mild. Scarlet fever has occasionally proved severe. When continued fevers occur, they early require, and quickly improve under, a stimulating mode of treatment. Amongst the young, chilblains are very common; hæmorrhoids amongst the middle-aged. Both affections indicate a tardy circulation of the blood. On this account it is, I believe, that the latter affection, when it occurs in a consumptive invalid, provided it do not lead to large losses of blood, is of good import rather than otherwise. The doctrine that hæmorrhoids, when moderate, are "a salutary operation of nature, and a preventive of phthisis,"* dates from Hippocrates, and is entertained by many German and French physicians.

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* West on 'Diseases of Females,' p. 41.

Amongst the natives of Torquay, consumption is less common than in many other parts of Great Britain, but it is seen sufficiently often to deprive the place of any character that might be claimed for it of immunity in this respect. There is, indeed, no part of the world in which, if carefully sought for, pulmonary consumption would not be found.

It is a fallacy not uncommonly received, to infer that a place in which such a disease as consumption arises spontaneously cannot therefore be of any especial service to persons from a distance who are affected with the same disease. As consumption depends upon lowered vital power, it may and does arise in any and every climate; and to remain in the same identical climate affords, of course, no fresh stimulus to the vital energies of the patient. It is the change from what was before habitual to something fresh and suitable that is useful. Hence, when a native of the shore becomes consumptive at the sea-side, he is benefited by moving inland, notwithstanding that the sea air to a landsman is so renovating. Hence, too, the advantages to those consumptive invalids who can bear it, of mountain air during the summer, after spending the winter at the sea-coast. The natives of the coast towns in Peru, when they become consumptive, are sometimes cured by removing to one of the high mountain towns on the Andes, situated from about 5000 to 10,000 feet above the level of the Pacific. "In Huanuco, which is about 7000 feet high, the thermometer rarely, throughout the whole year, rises above 72°, or falls below 66° F., in the shade. But at Rondos, a small hamlet situated on an acclivity above the city of Huanuco, and about 1000 feet, perhaps, higher than the city, the temperature may be about ten degrees lower; and here persons affected with pulmonary consumption," *i. e.*, persons so affected who come from the hot humid coast-climate of Lima, "experience more relief than in the vale beneath. Indeed, from 8000 to 10,000 feet appears to be a very favorable degree of elevation on the Andes, where the snow line is about 15,000 or 16,000 feet, for the recovery of those affected with pulmonary complaints. The extreme of cold seems to be as hurtful as the extreme of heat, and too rare an atmosphere as injurious as too dense. * * * I am disposed to believe that much of the advantage which is known to arise to those who, when affected with pulmonary consumption, change from the climate of Lima and the coast in general for the Sierra, proceeds from the change which is thus induced in the capacity of the chest, pulmonary tissues, and air-cells. For when youthful patients, especially, are transported from the coast to the Sierra, by gradual stages, as suited to their actual state of weakness and disease, is it not reasonable to think that the pulmonary organs and the thoracic cavity will be gradually enlarged and adapted to the rarer atmosphere of elevated regions, as we find to be the case with the mountain Indians? * * * Whatever be the particular form or primary character of pulmonary consumption, certain states of the air, depending on different degrees of altitude, appear to be either hostile or favorable to its existence or development, according to the particular locality in which the patient happens to reside. Thus, on the '*hot moist*' coast, it is a common disease; but on the intermediate mountains and in the temperate valleys of the interior, pulmonary consumption is a rare malady, whether tubercular or otherwise in its specific character."*

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* Dr. James Johnson, 'Influence of the Atmosphere on Disease," 2d ed., p. 28.

In Mexico, the Rocky Mountains are resorted to with advantage. In India, pulmonary invalids are sent to the Hill Sanatoria, or to the Cape, or home to England. Dr. Hegewisch, of Vera Cruz, informs me that consumptive patients there, when in the first or second stage of the disease, obtain much relief from removal to a cooler climate on the high ground, "and often the progress of the disease is checked for years." Vera Cruz is excessively hot and humid, having an annual rain-fall of 185 inches. Here we have an example in which removal from the coast, and a change from excessive heat and moisture, to a more temperate and dry climate, proves salutary. I now adduce a converse fact in which removal from a hot and dry inland region to the more humid but warm sea-coast, acts beneficially on the consumptive. The English vice-consul at Tripoli writes me, "Consumption is of very rare occurrence here; it is, however, sometimes very prevalent amongst the slaves who are brought from Central Africa, and it is an odd and striking circumstance, that even those who arrive here in an apparently incurable state, mostly recover very quickly, and appear to thrive very well afterwards."

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* Dr. Smith on the Diseases of Peru, 'Edinburgh Medical and Surgical Journal' for 1840.

We may take it as a rule that, for a consumptive patient, it is not so much the absolute scale of temperature that should be considered, as the change to a climate milder and more equable than the one to which he has been accustomed. And this is consolatory, for on any other terms a resort for the consumptive would seem to be an Utopia. Consumption is least common amongst the inhabitants of the severest countries—the Arctic regions, Siberia, Iceland, and the Hebrides. One reason may be, that as none but persons of hard constitution can live here, those children who would ultimately prove consumptive die during infancy. As a result of this, as none attain maturity but such as are extra hardy, the race soon becomes unusually hardy as a matter of hereditary descent. But putting consumption aside, the longevity of the inhabitants of these severe countries is not great, and the infant mortality is enormous. In a part of Iceland, "the average mortality for the last twenty years during the first twelve days of infantile life, has been no less than 64 per cent., or nearly *two out of three.*"* In the island of St. Kilda, one of the Western Hebrides, it was stated by Mr. Maclean, in 1838, that four out of five of all infants born, died from trismus nascentium (infant's lock-jaw) between the eighth and twelfth days of their existence."*

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* Carpenter's 'Human Physiology,' p. 554, 4th ed.

"Tubercular consumption," says the eminent geographer, Mr. Keith Johnston, "cannot be said to be a disease peculiar to any one portion of the globe, or to be dependent on climate in any appreciable degree, unless it can be shown that it does not prevail in the excessive climates of the north. It originates in all latitudes from the equator, where the mean temperature is 80°, with slight variations, to the higher portion of the temperate zone, when the mean temperature is 40°, with sudden and violent changes. The opinion long entertained, that it is peculiar to cold and humid climates, is founded in error. Far from this being the case, the tables of mortality of the army and navy of this and other countries, as well as those of the civil population, warrant the conclusion that consumption is more prevalent in tropical than in temperate countries."† This last conclusion is, perhaps, too general. It should only apply to the class of persons of whom the returns are made up. It will, probably, prove true that, other things being equal, consumption is less frequent in tropical climates than in temperate ones.* All, however, that I here contend for is, that the fact of consumption arising in an inhabitant of a given locality is no reason whatever why that locality should not prove most suitable for those consumptive invalids in whom the disease commenced whilst residing elsewhere. The question is not, where may a hardy man live and feel the hardiest, but where may a delicate person continue to live at all? And the practical reply may be given in the form of another question. Where is an invalid *with consumptive disease already commenced* likely to live the longest, at Torquay or in Siberia?

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* Carpenter's 'Human Physiology,' p. 555, 4th ed.

† 'Journal of Health,' July, 1856, p. 60.

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* The opinion given to me in conversation by every medical man returned from India with whom I have conversed is, that when there he saw almost nothing of consumption. That incipient cases were cured; confirmed cases accelerated by that climate. Mr. Martin is of the same opinion: "There are two classes of persons to whom our climate seems genial—the weak-chested, as they are called in England, who are of a scrofulous habit, but in whom pulmonary disease has not actually declared itself. These are saved by going to India; and I have known many persons in the curable stage of consumption—that is, labouring under the preceding stage, or that of "tuberculous cachexy," enjoy good health in Bengal, and survive their brothers and sisters at home. The fate of those, on the other hand, who go the East with suppurating tubercles, or even in the stage approaching to it, is only precipitated. Persons of phlegmatic habit, also, with dyspepsia, languid circulation, and cold extremities, seem to have better health there than in Europe."—'On the Influence of Tropical Climates,' p. 40, last edit., 1856.

CHAPTER III.

ON SOME OF THE LOCAL PECULIARITIES OF TORQUAY RELATING TO ITS CLIMATE.

In speaking of the influence of the climate upon disease, the effect of a residence in the most defended part of Torquay has been taken as the type. Torquay, however, has not one climate only, but several climates. All partake in the general characteristic of being soothing to the respiratory organs; but in their effect upon the nervous, digestive, and muscular systems, they differ more considerably than a stranger would deem probable.

Torquay is situated on a small imperfect peninsula, having a wide base landward to the north; and bounded by the English Channel on the east and south-east, by Torbay on the south and south-west. On the west, Torquay and the neighbouring district are separated from the Atlantic by the breadth of Devon and of a portion of Cornwall. The elevated range of Dartmoor running almost through the centre of the county from north-east to south-west, extends for about twenty-two miles in length by twenty miles in width, and forms at once a natural division between North and South Devon, and a permanent barrier to the latter against the full violence of the westerly and north-westerly gales. This forms the first great outer defence of Torquay. Proceeding by the coast from Torquay to Teignmouth, rather more than midway commences the range of elevated ground which constitutes the second great outer screen. Curving irregularly from the sea on the east, it forms the beautiful ridge of Barton Cross, and dipping in a narrow valley where the Newton road passes King's Kerswell, immediately juts upwards again in Kerswell Down. From this point a general semicircle of high ground trends along by the outside of Tor, Cockington, Paignton, and Brixham, to Berryhead, forming the horizon-boundary which is seen from the hills of Torquay for about twenty miles, coursing from east by north and west, to south. Taking the Windmill Hill as the nearest point of the top of this range to Torquay, it is here distant from three to four miles. Torquay is thus embraced on all sides, excepting the east and south, by a range of elevated ground at some distance. Its defence from the east lies nearer.

What may be termed the three hills of Torquay, *par excellence,* slope towards each other and towards the Bay. The central and northern one is called the Braddons at its front and lesser elevation, the Warberry at its second and greater height. The eastern hill is named Park Hill towards the Bay, Silver Hill towards the Meadfoot road. The western hill is the Waldron or Warren Hill. Between, and at the foot of these three hills, lies the quay or harbour of Torre—the original Torquay. Torbay here forms a little secondary bay extending from the Livermead promontory on the west to the projection of the Daddy-hole Rocks on the east. Thus, Torquay is placed on a peninsula belonging to the larger peninsula of the south-western counties, and in a small secondary bay belonging to the larger Torbay. It thereby obtains many of the climatic advantages without any of the inconveniences of an insular position.

The Torbay aspect of the Warberry Hill is slightly west of south. Warren Hill has a south aspect towards the Bay, and an eastern one towards the town. Silver Hill looks westward over the town and bay.

Beyond Silver Hill is situated the beautiful district of Meadfoot, which is defended from the east and north-east by the extensive range of cliff which stretches along the Channel from Petit Tor by Babbicombe to Hope's Nose—the northern horn of Torbay. Lofty hills back it up to the north, and thus complete its defence on the east, north, and west, whilst it is defended from the south-westerly winds by the plantations and plain of Daddy-hole. It is open to the sea on the south-south-east and south.

On the table-land north of Babbicombe lies the large village of St. Marychurch, now rapidly becoming joined to Torquay. Marychurch is separated from Torquay by the large central hill —the Warberry. The base of this hill on its north-western aspect is distant about a mile, or rather more, from Marychurch. Towards it, from the high ground on which Marychurch is built, the land gently slopes, forming a broad incline looking south towards the back of the Warberry, and towards the pretty rocky valley of Ellacombe. This gently sloping plain is defended on the east, south-east, and west, but owing to the break in the distant range of hill where it lies north-west of Torquay, there is no elevated ground on the north-west between this and Dartmoor; distant, if we take the beautiful and conspicuous Hey Tor to represent the margin of the moor, about fifteen miles. The Warberry Hill obstructs the blow of the sea-breeze from the east and south-east. Owing to the free admixture of the air from Dartmoor with that of Torbay, to the partial barrier placed by the Warberry Hill against the full ingress of the latter, and to the absence of any rocks or steep hills sufficiently near to radiate heat upon the houses, the high ground on the Marychurch Road is far the most bracing of any part of the neighbourhood of Torquay. Indeed, during the prevalence of the only land-wind which Torquay obtains—namely, the north wind—visitors from a distance always pronounce the air here to be not only comparatively, but positively, very bracing.

After this, the most bracing situation is the higher part of Torre. Then the western edge of the Warberry Hill. Then Meadfoot and its neighbourhood. Lastly, Torquay within the hills, which, excepting during the occasional prevalence of northerly winds, is the reverse of bracing.

It is sometimes forgotten that a pulmonary invalid requires not only a mild air to breathe, but also plenty of it. To plant a house close to the perpendicular face of a rock, unless there is always a breeze blowing across it, is a mistake. The air almost stagnates, and becomes oppressive from the heat of the sun radiated from the face of the rock, or damp if no sunshine can reach the rock behind the house. A sloping face of hill retreating from the back of the house to a distance, on the other hand, is a radiating screen which keeps in, and adds to, solar warmth without rendering the air oppressive; and this very general feature here is one of the peculiar advantages of Torquay. And provided the situation be close to the sea, so that the air is constantly renewed by the sea-breeze, the above objection to houses placed in front of a perpendicular rock loses its force.

In addition to the several hills already referred to by name, there are many other elevations irregularly placed in and around Torquay, which serve as so many inner screens from the colder and more boisterous winds, and furnish sites covered with detached houses, having every possible variety of view. Owing to the advantage which has naturally been taken of this capability, Torquay consists of an aggregation of detached villas, placed in tiers one above another, dotting thickly the several faces of every hill, extending about three miles lengthwise (from St. Michael's to Kilmorie), and in breadth spreading into St. Marychurch. Considering its resident population, Torquay covers far more ground than any other town in the kingdom. The result of this is, not merely the beauty which charms the eye from the number of elegantly built stone houses, each standing in its own admirably kept garden, luxuriant in evergreens throughout the entire year—although constantly to look on something beautiful in Nature is, like every other innocent gratification of sense and imagination, no unimportant gain to a chronic invalid—but the more solid benefits of a free ventilation and of a more complete exposure of the inside of the rooms to air, light, and sunshine, than can be obtained when a house forms one of a row. Excepting the main thoroughfare lined with shops, Torquay has no streets; they are all roads, having gardens on each side, and a house in each garden. It might be supposed that these advantages could be obtained only at the expense of warmth, since houses in a row borrow warmth and defence from each other. But owing to the style of building the detached houses here are unusually warm. This arises from the geology of the district. A dense, brittle, gray limestone lies so near the surface, that sufficient to build the house is often removed in excavating the cellars; or otherwise it is obtained from some rock in the immediate neighbourhood. As this stone is not easy to dress, the walls are built of irregular pieces, imbedded in mortar made from the same limestone, burnt. In order that they may hold well together, and in consequence of the cheapness of the material thus obtained almost free of carriage, the outside walls are usually twenty-two inches, or two feet, in thickness of masonry. They are covered with smooth cement on the exterior, and everywhere battened on the interior. The stratum of air between the battening and the wall being a bad conductor of heat, of course prevents the warmth within the room from radiating through the walls, whilst the external smooth cement effectually prevents any damp from the absorption of rain. A glass door within the main door opposes the unnecessary cooling of the passages whenever the house-door is opened. And, as a rule, this main door is placed at the side of the house, leaving the entire south front disposable for bed-rooms and sitting-rooms. The consequence of all this is that, without any extra expenditure on the part of the builder, the detached houses at Torquay are unusually warm in their architectural construction.

There is, perhaps, no place in which so many houses possess such beautiful prospects, each in some respect differing from the rest. This affords an extensive range for selection as regards taste, and, what is more important, as regards exact suitability to the requirements of the invalid.

No other place in Great Britain combines to the same extent as Torquay the sanitary advantages of complete country with the conveniences of town. Nor is this a point of slight importance, when we know that consumption "is uniformly more fatal in cities than in the country. In England the excess in cities is equal to twenty-five per cent."*

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* In Massachusetts, towns and country taken together, consumption "destroys *one half* of all who die from every

Of the invalid new comers which every season brings to Torquay, many prefer to be settled in their lodgings before they see their medical adviser. They think that the climate of Torquay must be of equal service to them in whatever part they plant themselves. But, in truth, within a small compass of space, the localities here have so many slight modifications affecting their adaptability to different constitutions, and different states and stages of pulmonary affection, as to render it the more prudent plan for an invalid on his first visit to Torquay to seek the counsel of his medical adviser before he decides upon the situation he intends to occupy. This is the more desirable, as a change after Torquay has become filled to a more suitable situation is occasionally a matter of some difficulty.

As far as any general direction can be given, it is desirable to place a feverish consumptive case close to the sea in some one of the most defended situations, provided the sea-air undiluted is not known beforehand to disagree with the patient. When feverishness is less marked, and there is more danger to be apprehended from sinking of the powers of life, a situation part-way up the hills suits better; or Meadfoot, provided close

kind of disease between the ages of 15 and 30." (Keith Johnston, 'Journal of Health,' p. 62, No. 6, for July, 1856.)

proximity to the sea be desired. After a residence at the sea-level for some time, removal by degrees up to even the highest houses on the southern face of the hills often proves more advantageous than a longer continuance in the part which originally was most useful. Conversely, the removal for a time into the close influence of the sea is often found to be beneficial to invalids who, before they were somewhat seasoned, were better accommodated at a certain distance up the hills. A stranger usually marvels that the houses so high above his head can be proper places of abode for persons with delicate lungs. Experience, however, proves not only that these situations are fully as warm as, though they are more "blowy" than, the low ones; but, moreover, that pulmonary invalids do exceedingly well in them. Indeed, a person who breakfasts early will often inhale a warmer air at breakfast-time if he live at a moderate elevation, than one who resides on the lowest ground; and for this reason:—during the night the ground cools more than the sea-water. A gentle interchange of the warmer air from over the sea and the cooler air from over the land takes place, which renders the early night air so strikingly mild to any stranger who happens to walk home from a party in the winter at Torquay. Towards morning the stratum of air which is nearest to the ground has become the coldest, and from being colder it is also damper, because the cold condenses and sets free the moisture which when the air is sufficiently warm remains insensibly diffused through it. As the sun rises, this coldest and lowest stratum of night-air is wafted off from the face of the hills, and gives place to a fresher, drier, and warmer air. Whereas in the low ground, from the absence of breeze, the removal of the lowest stratum of cold air is rather a process of gradual diffusion, which does not effectively take place until later in the day, when the heat of the sun is greater. Add to this, that a high situation receives the direct rays of the sun both earlier in the morning and later in the day than a low situation. To the houses which are situated close to the sea these remarks scarcely apply. The modifying influence of the warm sea-air there overrules the local agencies here referred to.

On the coast, on the numerous terrace-roads, and in the many intersecting valleys, there is sufficient of level ground for the purposes of exercise; but the general face of the district is of course uneven. It is a natural consequence of this unevenness of surface, of the limestone formation on which it stands, and of the absence of a river, that Torquay is free from land-moisture. We have no fogs, excepting sea-fogs, and these are rare. Rolling over the hills, like great wool-packs, they appear and vanish, for an hour or two, rarely lasting the entire day. They are always warm, and seem neither to injure nor annoy the invalids. As a proof of the absence of fog, November is considered to be one of the most delightful months of the year at Torquay. We read in the papers of dark, dense fogs elsewhere on days which here have been bright and sunny, or at most gray and sunless. Torquay is occasionally imagined by people who have never visited it to be habitually gray and cloudy. It is exactly the contrary—the very type of "sunny Devon." The invalid will find here more of sunshine to gladden his heart, and invigorate his strength, in that unknown way in which the sun does act on living beings, than he has left behind him, come from whatever part of Great Britain he may.

The electrical character of the district is no determined with any accuracy, but thunderstorms are very rare, and it is not known that harm has ever been done by lightning in Torquay.

The insensible humidity of the air at Torquay is derived from the sea; and not as in damp places from land-moisture. On this account, perhaps, as well as from the superabundance of evergreens, and from the care universally taken by each proprietor, for the sake of his own gratification, to keep his garden in order, no practical inconvenience is experienced in autumn from "the fall of the leaf."

Without referring in this place to statistics, as regards the amount of rain, the impression of a resident would be that rain falls very heavily when it does come, but that the wet days are not numerous, and that we have long-continued dry seasons. During a rainy season, a wet morning often yields to a blue sky and a smiling afternoon. But the circumstance which most pleasingly strikes a stranger is the warmth of our wet days, in place of the cold chilly rain so customary in the North.

In many winters snow is not seen at all. When it comes it is never deep, and never remains for any time. And perhaps nothing more strongly exemplifies the natural shield furnished to Torquay by the elevated range at a distance, than the fact that the snow on Dartmoor has been deep enough for soldiers from Prince's Town to be lost, and found buried in it, whilst at Torquay (within thirty miles) there has been no snow at all. During the month of November, 1856, the weather at Torquay was bright and fine and warm, completely "l'été de Saint Martin," until the 28th, which was a thoroughly wet but not a cold day. Yet in the same period falls of snow occurred in Scotland, in Paris, and in

Dorsetshire. The weather elsewhere is reported as severe, foggy, and dismal. A correspondent from Streatham, near London, who has recently been staying at Torquay for his health, writes—"Yesterday (November 26th) in London the fog was so thick you could not see across the street. This morning we have four inches depth of snow. I wish I was back again." On the 27th, a gentleman left Coventry, where it was cold and snowing; he found a bright and warm afternoon on reaching Torquay. I quote the 'Torquay Directory' of the last week of November. "The following extracts from letters recently received from Pau and Nice must lead us to appreciate most fully the mildness of our Torquay climate:"

Pau, November 13th, 1856.—"Sometimes in the middle of the day the sun shines out delightfully warm; but on the whole it is very cold, though every one tells us when we have had a little snow it will be much milder."

Nice, November 14th, 1856.—"I have never been much colder than since we came here. Bitter cold winds, snow on the neighbouring hills, and great difficulty in keeping up a good fire. I should think you were much better off at Torquay. There are not many English families here now."

How then shall we characterise the climate of

Torquay? Perhaps, until our knowledge of all the elements of climate is more exact, attempts at precise definitions of local climatic character in general are better avoided. All such distinctions of climate as that into "exciting, sedative, and relaxing,"* are more exact upon paper than in Nature; more adapted to special pleading for or against a given place, than practically useful. At the best, they can only be approximations to the truth, depending for their accuracy on the kind of constitution and existing state of health of the individual who puts them to the test. To guide an invalid, detail, not definition, is at present wanted.

In respect to Torquay, much reasoning in a circle has arisen from the use of the epithet "relaxing." "It must be relaxing," says one, "because it is so damp in winter, and so hot in summer." And, "It must be very humid," says another, "because it is so relaxing." On the other hand, as the result of meteorological observation for a number of years proves that it is neither damp in winter nor hot in summer, "therefore," say its partisans, "how can it be relaxing?"

Now, taking as our best climatometer for the present purpose, an intelligent human being, endowed with a sensitive nervous system, and a delicate mucous membrane, the climate of Torquay may be characterised in one word as being "soothing." If it be so to a pulmonary invalid,—to a robust healthy stranger should we expect it to prove energising or enervating? Decidedly the latter; and so it does. When a summer tourist who remains at one of the hotels on the quay for a day or two decides that "Torquay is too relaxing" for him, he is quite right; his conclusion is not mere fancy. On the other hand, the invalid who becomes stronger at Torquay than at some bracing place where his disease was a perpetual fret to his strength, will not allow that the climate is relaxing. To him it is a strengthening and not an enervating place. Whilst his healthy companion, it may be, feeling at first, until he becomes seasoned, less than his former vigour, and less than his customary keenness for food, decides that to him Torquay is relaxing. Unquestionably, both are right.

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* Taylor on the 'Climate of Pau.'

Dartmoor is damp; Torquay is dry. Yet to a person in health the former is bracing; the latter is not. So of the Highlands of Scotland or the mountains of North Wales. Many places damper than Torquay are thus less relaxing.

In summer, London and Paris are considerably hotter than Torquay, but they are either of them less relaxing. In August, 1851, when the thermometer in the shade in London marked as its maximum 90°, in Torquay it marked only 70°. "During the hot weather at the end of July, 1856, the highest temperature in the shade out of doors, registered on the Marychurch road, was 76½°; and in the night of the same day, the lowest was 60°; giving a range of 16½° in twenty-four hours. At Worcester, on the same day, the thermometer rose to 90°, and in the night fell to 50°, giving a range of 40° in the twenty-four hours." (Mr. Pengelly.) Many places hotter than Torquay are therefore less relaxing.

Without attempting to offer any explanation of the fact,—that Torquay is what people usually mean when they term it relaxing, is, in my opinion, as certain as that it is neither damp in winter nor very hot in summer. It is not possible that the same place should possess contradictory qualities; if it were not enervating to the strong until they become seasoned, Torquay could not be so soothing as it is to an irritable pulmonary invalid.

Still, allowing this, too much is often inferred from the term "relaxing." A clergyman or a vocalist who suffers from "relaxed" throat, might suppose that a "relaxing" climate could not suit him. Yet, inasmuch as such relaxed throats have a good deal of irritative congestion about them, Torquay is found to be quite a remedy for them.

The enervating effect of Torquay upon a stranger must be understood to apply only to "Torquay within the hills," and not to "Torquay upon the hills." Moreover, it is not the same at all times. The climate is not at all relaxing during the prevalence of the winds which are positively electric—the north and east; it is chiefly so when those winds prevail which are negatively electric—namely, the south and south-west. Now, as these predominate in frequency, the conclusion is obvious.

To a person in health, the most delicious air at Torquay is during a gentle north-west wind.

It occasionally happens that certain situations in Torquay do not permanently suit persons who by a proper change of district may find hereabouts a position which agrees quite well with their health. For example, amongst those who have tested the relative effects of different parts of Torquay, and found reason to decide that the high and open ground on the Marychurch road would agree with their general health, whilst the lower situations closer to the sea would not, are two resident physicians—one being the writer. On this point, therefore, he can speak with confidence.

In all places about from 3 to 4 a.m. is

the coldest part of the twenty-four hours. In all inland places the cold morning air entering the bed-room irritates the chest, and feels "sharper" to the invalid than at any other time. A pulmonary invalid habitually coughs the most in the morning on awaking from sleep. Perhaps the mildest inland situations in the kingdom are the moderately elevated parts of Bath (viz., the west sides of Gay Street, Brock Street, and the Royal Crescent); and the York Crescent and West Mall at Clifton. But Torquay has a marked superiority over even these places in the mildness of its night-air.

A collateral advantage of Torquay is the extensive district in which the pulmonary invalid may take out-door exercise in a carriage or on horseback without any greater change of air than is salutary to him. Southward, towards Plymouth and Cornwall, in fine weather the only limit is that of the patient's strength and convenience. In the opposite direction, Exeter, twenty-three miles distant, is one of the cleanest and neatest, and, I may add, most healthful of cities—standing second in its mortality returns only to Bath. Nearer to Torquay, so irregular and varied in direction are the ranges of high ground, that the invalid can find a well-defended walk or drive from whatever quarter the wind may blow. A description of the numerous local beauties of scenery far and near which tempt him to excursions, the visitor will find in any of the several well-written guide-books of the neighbourhood. The superb views of Torquay itself cannot be seen from any one spot. To realise them, the visitor must go to the top of each hill in succession. But the most extensive panorama of all is visible from the highest point of the Warberry Hill. In its own style of beauty, few scenes in Europe can compete with this. A sunrise or sunset seen from here is very fine. If the traveller miss the special glories of the Righi, of Snowdon, or Ben Nevis, he misses also the toilsome ascent, the dismal night, the damp blankets, sharp frosty air, chattering teeth, and shivering body, and the not improbable chance of seeing nothing but mist as his reward.

CHAPTER IV.

ON THE SUITABILITY OF THE CLIMATE OF TORQUAY FOR THE CONSUMPTIVE.

Is a climate which produces the effects I have cursorily described such as we require for a consumptive invalid? To this question I will endeavour to reply both by facts and reasoning.

A stranger can scarcely fail to notice the singular variety of names on the signboards of the numerous tradespeople of Torquay. This is owing to the circumstance that so many of them originally came to the town from all parts, on the score of health; recovered, and afterwards set up in business. Of these persons, by far the larger proportion—almost all—were pulmonary invalids; in some instances, men who had lost large quantities of blood from the lungs. By these renovated invalids every district in the kingdom is represented amongst the tradesmen of Torquay.

Of the resident gentry, who constitute the great bulk of the inhabitants of the place, there are few who were not in the first instance attracted hither on account of having an invalid member in their family. Of these invalids, very many have continued to live on with comfort.

Other residents who came here as pulmonary invalids in a precarious state have recovered sufficiently to enable them habitually to pursue an active and tolerably arduous life without inconvenience.

These statements are necessarily vague; but the examples to which they refer are too numerous and well known on the spot to be set aside as fallacious. As a broad rule, when any person after appearing to be delicate for some time has had, without any attack of active inflammation of the lungs, cough and spitting of blood, whatever may be the unknown particulars of his case, we shall be correct in considering that he has been a pulmonary invalid, and in a critical state of health.

In the notable growth of Torquay during the last twelve years*—an increase due entirely to the preference of the public, and not to any especial favoritism on the part of medical authorities at a distance—we have an argument in support of the real good derivable from the climate by a suitable class of invalids. No speciousness of representation would induce those who have travelled and tested place after place, both at home and abroad, to finally select Torquay, and return to it winter after winter, were not its advantages to their health and comfort a reality. Torquay increases so rapidly because one invalid recommends it to another. Every succeeding season (from September to May) brings an increased number of invalids. And this fact alone, irrespective of details, is not without weight, when we consider that almost always a person comes to spend his first winter at Torquay very much against his inclination.

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* The population of Torquay was, in 1801, 838; in 1811, 1350; in 1821, 1925; in 1831, 3582; in 1841, 6000; in 1851, 11,460; in 1854, 14,000; and about 3000 in St. Marychurch.

Of the new cases which every season brings, a fair proportion do well. By far the greater number experience marked relief. In many, the pulmonary disease becomes stationary, ceasing to make the progress it was previously making; and, in this case, the patient eventually improves in general health, even though his pulmonic affection remains unaltered excepting in respect to its activity; and he lives on as a constant, but usually far from miserable, valetudinarian. In some, the disease is positively arrested, and undergoes one of the several modes by which Nature cures pulmonary tubercle; and although the patient seldom becomes robust, he enjoys health and as much bodily strength, perhaps, as before his lungs failed. We have examples, indeed, amongst the residents here, of individuals under such circumstances of recovery, who are now stout, robust men.

On the other hand, many persons come here but to die. In the closing stage of their fatal disease, beyond all chance of benefit, they are sent to Torquay as a last resource, and die not unfrequently within a month of their arrival.

And here I must observe that the public cannot be too forcibly impressed with the fact, that in order to gain the full benefit of a residence at Torquay for pulmonary consumption, the patient should come as early after his disease has declared itself as possible; as soon even as there are adequate grounds for suspecting delicacy of the lungs. At the same time, there is no stage of consumption so advanced that removal to this climate may not afford some amount of relief, provided the invalid have strength enough to support the fatigue of the journey.

There are, however, I believe, two exceptions to this. The first is—the very rare cases of the most acute forms of pulmonary consumption in which the symptoms resemble those of typhus fever more than those of ordinary phthisis. Such cases terminate fatally in from three to nine weeks, and are beyond the reach of benefit from either medicine or climate. The second is the far more common class of cases of consumption in which the chief stress of the disease has fallen on the bowels. It must not from this be supposed that the occurrence of diarrhœa in a consumptive patient renders it unwise for him to come to Torquay. So long as the diarrhœa proceeds only from an irritable and congested state of the intestinal mucous membrane, it will be benefited by Torquay. But when it arises from tubercular ulceration of the bowels, I have never seen reason to conclude that the patient derived any benefit from being here. In these cases, the chest-symptoms are less troublesome in proportion as the intestinal symptoms are more so. "One fire puts out the other's burning." I suspect that an inland situation (Clifton for instance) is better for such sufferers than the immediate neighbourhood of the sea.

The distinction between the diarrhœa from mere congestive irritation, which Torquay will benefit, and the diarrhœa from ulceration, which Torquay will probably not benefit at all, cannot be made by the patient. His medical adviser must, of course, decide the question.

Perhaps there is no class of invalids in whom the safety of residing at Torquay is more demonstrable than in those who, without any previously noticed signs of pulmonary disease, have ruptured a blood-vessel in the lungs and lost large quantities of blood. The examples are numerous of persons driven to reside here by such an occurrence. They sometimes become so well as to forget their weak point, commit some indiscretion in muscular exertion, or otherwise, and have from time to time an attack of hemorrhage from the lungs, from which they recover and go on as before. Some escape all attacks whilst they remain at Torquay, but experience them on leaving it. One gentleman, who has resided for many years in a hot climate, never goes to London without beginning to spit blood, from which he is entirely free whilst at Torquay.

But apart from the particular facts which are patent to any non-medical observer on the spot, there are general reasons for deciding that the climate of Torquay is an appropriate one for patients suffering from, or predisposed to, pulmonary consumption. And in considering these, it will be necessary to enter rather more into medical arguments than may suit the taste of the general reader, whom I suppose myself more particularly to be addressing.

When a person has cough, expectoration, more or less uneasiness in the chest, evening heats, night perspirations, loss of strength and of flesh, he has the symptoms which characterise the most common form of pulmonary consumption. But he may have all these symptoms and yet not be really consumptive at all. Not to enumerate all the examples of other diseases which appear to be, and yet are not, tubercular consumption,—and with which all medical men of the present day are familiar, and of which charlatans now and always make great harvest,—I will refer to one or two instances by way of illustration.

During the last few years I have been called upon to attend patients sent here as consumptive, but who were really suffering from the following diseases respectively, and were not true consumptive cases. Simple chronic bronchitis, with dilatation of the bronchial tubes; subacute inflammation of the lungs in the young; chronic inflammation of the lungs of limited extent, in the aged, and in adults; chronic pleurisy; subacute inflammation of the liver; disease of the heart, with congestion of the lungs and bronchial irritation.

A little boy, æt. 7, was sent as being in a rapid consumption. His case proved to be one of subacute inflammation of the lungs without tubercles. He quite recovered and became strong.

In the summer of 1854, a young lady, æt. 19, was sent to Hey Tor Vale, as being in a rapid decline. In addition to the above symptoms she had great breathlessness on exertion, faintness, and her cough was incessant. Her case proved to be one of subacute inflammation of the liver. She perfectly recovered and is now in health and strength.

By a noticeable coincidence the opposite error of mistaking real consumption for mere disease of the liver was illustrated at the same time and place. A gentleman who presented some of the usual symptoms of consumption, but who had a bilious tinge of complexion, and suffered much from indigestion, was assured that he had nothing amiss with his lungs, "it was all liver;" a conclusion which the patient was but too happy to believe. He died of consumption in the ensuing spring. This kind of mistake is not even yet very uncommon, and the pertinacity with which the patient clings to the idea, if once suggested, that his cough is "only a stomach cough," or a "liver cough," is more striking than unnatural.

But if we occasionally meet with cases supposed to be consumptive which are not really so, far more frequent and far more serious is the mistake of overlooking the presence of tubercles in the lungs when they really exist. So uniformly fatal, indeed, has consumption been considered, that the mere circumstance of recovery until recently was held to negative the previous existence of the disease. With such a view, to prove satisfactorily that permanent benefit resulted from any mode of treatment whatever, was impossible. But we now know that under favorable circumstances the cure of consumption is not only possible but demonstrated; and although we cannot quite subscribe to the opinion that "Phthisis, in its incipient stage, may be considered a very curable disease,"* we yet believe that many persons have tubercles to a small extent at some part of their early life, who live through their ailment, and, becoming healthy men, have not themselves the least suspicion that they ever were tuberculous.

As instances of recovery from consumption of various degrees of severity I will adduce the cases of four medical friends of my own.

A youth occasionally expectorated spots of blood and the little stony concretions from the lungs which are the débris of small tubercles that have undergone the calcareous form of cure. He became an industrious and successful medical student, subsequently obtained a large and arduous country practice, which he followed for several years, remaining free from chest-symptoms, and died of fever contracted in the discharge of his professional duties.

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* Dr. Hughes Bennett on 'Pulmonary Tuberculosis,' p. 57.

A gentleman who had worked hard at his studies, whilst growing very rapidly, began to spit blood and became very thin at the age of twenty-two. A certain amount of uneasiness in the chest, and the spitting of blood, continued for some months. Being a medical man, he wore an open blister on his chest for twelve months, took much horse exercise, and by degrees obtained one of the largest practices in the Midland counties. He has now been constantly engaged in this arduous occupation for thirty-five years, and is as active and energetic as ever.

A fellow-student of my own was seized with spitting of blood and other threatening symptoms whilst attending the hospitals at Paris. For two years he took all proper care of himself, recovered his health, and then became a partner in a large general practice in Manchester, at which he worked assiduously for several years. He was stout, and free from chest-symptoms. He overtaxed his strength, and died, after a short illness, from disease of the kidneys. It was ascertained that the relics of cured tubercle existed at the top of one of the lungs.

The fourth case is that of a surgeon in one of the large manufacturing towns of Lancashire. He is now a hale, stout man, doing a large medical practice. Eight years ago he gave me this account of himself: "Twelve years since," said he, "I believed myself to be dying of consumption. I had all the symptoms of it, spat blood, and was reduced to a shadow. I went up to town, and saw the most eminent men for the chest, Dr. * * * and Dr. * * *. Both agreed that there was no chance for me, and that I had better settle my affairs. When I returned home I would not give up practice. Soon afterwards, from attending a case, I caught typhus fever. I turned a very narrow corner in this—port wine saved me. As I slowly recovered, I found I was recovering from my consumption as well as from my attack of typhus. My chest-symptoms gradually disappeared; and now I am as strong as ever I was in my life; and you may judge of my condition for yourself."

This is not the only instance in my experience in which typhus fever (treated by stimulants) has proved in a consumptive person to be a turning point to restoration to health. But far more commonly, in one who is predisposed to consumption, an attack of continued fever tends to develop the disease; and in one who is already consumptive it leaves the lungs in a worse condition than it found them. By a noticeable coincidence, a case exemplifying this was sent here two seasons ago, by the gentleman above referred to who had himself been cured by an attack of fever. A clergyman in the same town, previously well, but overworked, caught typhus fever, from which he slowly recovered, but with cough and other symptoms of consumption. When I saw him three months afterwards, the amount of mischief in the lungs was very considerable. Of cases like this, every medical man's experience furnishes him with but too many sad examples.

I have intentionally selected for illustrations the cases of medical men with whom I have been personally acquainted, because where everything depends upon the medical testimony being correct, a self-narrated history would hardly be sufficiently accurate if obtained from any other than a medical man. Nevertheless, it must be within the experience of almost every one to have known individuals who, having overgrown, or in other ways overtaxed, their strength, became thin and feeble, and spat blood, and were thought by their friends "likely to go off in consumption," as the phrase is; and who afterwards recovered, became strong, and almost ceased to remember their temporary delicacy. Of such individuals, the probability is that the majority really had tubercles in the lungs to some small extent, which Nature has cured.

Of the curability of consumption as a matter of fact, proofs of a more precise and scientific character might be furnished, but they would be too strictly professional for introduction here.* The question before us is, how far is the climate of Torquay calculated to promote it?

To enable us to discuss this intelligibly we must consider, in the first place, what consumption really is, and how Nature leads to its cure.

Consumption, when fully established, is always a twofold disease—a constitutional and a local disease. The local disease consists in the deposition of tubercle in the air-cells of the lungs, and in the morbid condition of the lung close to the tubercles; and subsequently in the changes which both the tubercles and the adjoining textures undergo. But, in order for tubercle to form in the first instance, the portion of lung about to be affected must be in an unhealthy condition to begin with; and the blood brought to it must be unhealthy also. The earliest local deviation from health in the lung I believe to consist in an atrophy of the delicate filmy tissue which lines the walls of the air-cells.* This atrophy depends upon a diminution in the vital power of nutrition in the part.

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* See Dr. Hughes Bennett's excellent work on 'Pulmonary Tuberculosis.' And an Essay by the writer on the 'Various Modes in which Pulmonary Tubercles undergo a Curative Change,' with engravings, in the 'British and Foreign Medico-Chirurgical Review' for April, 1856.

The unhealthy condition of the blood, without which tubercle would not be laid down in the lungs at all, is probably nothing more specific than a generally defective vital power on the part of the blood,—that living "liquid flesh," as it has been called;—a defect not peculiar to the blood, but shared by it in common with most of the structures of the body.

In order, then, for a person to become consumptive, it is only needed that he possess a state of blood in which it is short of its full vital power, and a state of lung in which some part of it also is not perfectly endowed with its vital properties of nutrition. Both these conditions must coincide, and they may be either hereditary or acquired. By any causes of protracted debility and impaired vital power, the strongest individual may be rendered consumptive, although he have not the slightest hereditary title to the disease. But if he has such a title, the danger is far more imminent. Either the local state, or the constitutional state, may precede and occasion the other. The poverty-stricken blood may impair the healthy nutrition of the lung, which is the commoner case where consumption appears to arise spontaneously and imperceptibly; or the impaired nutrition of the lung may be the first thing that occasions a deteriorated condition of the blood.

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* The facts and arguments in support of this opinion are given by the writer in an Essay on the 'Mode of Origin of Pulmonary Tubercle,' with illustrations, in the 'British and Foreign Medico-Chirurgical Review' for April, 1855.

Hence in every question which relates to pulmonary consumption, both the state of the constitution and the state of the lungs have always to be taken into account. But every case does not present the same relative amount of constitutional and of local disease. One patient may have great constitutional but comparatively little local disorder. Another will present a large amount of local disease whilst the constitutional disorder is slight. In different individuals we see every gradation. A person in whom, from hereditary predisposition, or original feebleness of organization, the constitutional liability is considerable, runs great risk of becoming consumptive spontaneously at the period of the completion of growth, because his powers of life are not adequate to meet the demands of perfect bodily development. This is one of the reasons why consumptive disease so frequently commences in the higher parts of the lungs; affecting, by preference, the part on which the stress of development falls latest—namely, the upper portions of the lungs, which are last to grow, at the time when the shoulders increase, or ought to increase, in width. Tubercle always attacks by preference a part which, so to speak, ought to grow but has not sufficient vital power to do so healthily. When the brain is growing most actively during infancy, in an unhealthy infant, tubercle selects the membranes of the brain and causes acute water-in-the-head. In early childhood, after the first dentition, the digestive organs are actively developed. Tubercle now selects them, constituting mesenteric disease, or consumption in the bowels. After the age of fourteen or fifteen the chest and organs of voice become actively developed, and the stress of such development affects, as already observed, particularly the upper parts of the lungs. Accordingly, if there be not sufficient vital power of nutrition to support the suddenly awakened activity of growth in the upper parts of the lungs, pulmonary consumption is threatening. The most fatal age in this disease is, therefore, from fifteen to thirty-five, when the shoulders have attained their full expansion. And although old people may die of consumption, still it is a disease to which the liability decreases with age; and if an individual with delicate lungs lives through the middle period of life, his chances of not falling a victim ultimately to death by consumption are much increased.

If this appears to be too medical for non-professional readers, let the importance of a correct appreciation of the quarter from which danger threatens, to all who have the guidance of the young, be an excuse. Knowing this, will a mother any longer wish her delicate daughters to be crammed with accomplishments which they will not live to display? or will she not rather attempt in every way to build up strength of chest and limb, trusting to the future for that vigour of mind which always follows in the wake of healthy development? Will a father stimulate the emulation of an intelligent pale-faced youth so to cultivate his mind that he must of necessity neglect the health of body without which his mental attainments cannot prove in any sense remunerative? Work the minds of the strong, for they are not so prone to injury from excess in things intellectual; but spare the minds of the delicate. They seldom need the spur. For them to strengthen the body is the true mode of strengthening the mind. The high-pressure system of education—as if a female must cease to learn everything intellectual by a certain year of her life!—has much evil to answer for. First, and greatest, consumption. If not that, a sickly married life, a weakly progeny, and consumption, probably, in the second generation. For growing girls, the usages of society at present do not allow nearly enough of out-door exercise, or of muscular freedom, for the good of the body; whilst they exact far more of attempted application of mind than is good for either mind or body. The healthy strong girl, who is never over-taxed, will become a more accomplished woman at thirty than the over-stimulated delicate creature whose accomplishments at seventeen are the admiration of all around her. Men are learners for the whole of their lives. Why not educate girls with the same intention? If they must know German and Italian, as well as French, and perhaps English, in addition to a smattering of all the sciences, and in addition to the more peculiarly feminine accomplishments, surely they are not obliged to have mastered these by seventeen! If they have learned by that age how to concentrate their attention, and how to reason, provided they have health of body, all ornate mental furniture may be added in due season.

But persons become consumptive who, to all appearance, had no predisposition thereto. An accidental attack of cold on the chest, of influenza, of pleurisy, or of some form of fever accompanied with congestion of the lungs, particularly measles and scarlet fever, appears to be the exciting cause of tubercle. It is usual to say that in such persons there was the liability beforehand, and that the local disease has merely wakened it up into activity. This, however, is only to be wise after the fact. And we do see persons who, as far as we have grounds for judgment, were originally quite as healthy as most people are, but who, when reduced in vital power by some continued cause of general exhaustion, whether in the shape of over-work, over-anxiety, or under-nutrition, if attacked by any form of inflammation on the chest, are left consumptive by it. As if the irritation led to such a local condition of lung on the one hand, and to such a general deterioration of blood on the other, as to issue in the formation of tubercles. In such a case, consumption is as much a *local* disease as most other diseases so styled are; since, apart from the effects of accident, there are very few local diseases of any kind which do not lead us to presuppose that the system was out of order before they made their appearance.

Consumption at its onset, therefore, in one case may be mainly constitutional, or in another it may be mainly local. It makes a great difference in the probabilities of improvement, which it is. However considerable the amount of actual pulmonary disease may be, it is always a relief to learn that the hereditary liability, or previous constitutional delicacy, was small. And, however slight the local mischief may be at the moment, the fact of strong hereditary predisposition, or of long-continued previous delicacy of constitution, ever renders the case more serious.

However it might be at its commencement, consumption, when fully established and advanced in its course, is always a disease in which the constitution is largely involved. In every instance the constitution suffers in proportion as the pulmonary disease becomes worse; and in every instance the course of the local disease is materially governed by the state of the constitution. Whether, therefore, the disease at its origin were mainly constitutional, or mainly local, its future course involves this,—that the constitution and the lungs improve or grow worse together, and that each reacts for good or for evil upon the other.

This being so, whatever will improve the constitution, provided it do not injure the lungs, must be beneficial; and, conversely, whatever will benefit the lungs, provided it do not injure the constitution, must also be beneficial. But in truth, as what we understand by the word constitution is merely the result of the aggregate vital power of all the organs of the body, and inasmuch as the lungs are such important vital organs, they are themselves practically a part of the constitution. The two are so knit together that in a case of consumption we are not able in any way to do good to the lungs without doing good to the constitution, nor to improve the condition of the constitution without at the same time improving the state of the lungs.

Thus stated, these remarks may seem to be little more than truisms; but they are not always borne in mind. Fifty years since, consumption was chiefly treated as a local disease, to the neglect of its constitutional element. Of late, the tendency of the day has been to treat consumption as if it were only a constitutional disease, to the neglect of its local element. The patient never commits this error; he at least always recollects the importance of attending to his lungs! Unquestionably either exclusive view is erroneous. Equally in our reasoning and in our practice, consumption must ever be dealt with in its twofold nature.

We have not then to seek whether or not a locality which does good to the lungs of a consumptive invalid will also benefit his constitution. It must of necessity do so.

From an extended survey of the influence of various healthy and morbid conditions of the system upon the course of pulmonary consumption, I was led to conclude that the condition of system which most favours Nature's efforts to cure pulmonary tubercle, and consequently the condition which it is most desirable to induce in a consumptive invalid, is—*fulness and slowness of the circulation.*[*] Any means by which the pulse is rendered fuller and slower—whether by diet, wine, climate, or medicine—are advantageous to a consumptive invalid.

The proper treatment of consumption is easier to state than to carry out. It consists in three things: to keep the lungs as free from irritation as possible; to improve the general health and strength in every way as much as possible; to render the circulation full and quiet.

Of late years it has been rather the fashion to underrate the importance of fulfilling the first of these conditions. And for the sake of backing up a system of case-hardening as the correct mode of treating consumption, it has even been asserted that inflammation of the texture of the lungs was the natural cure of tubercles! If that were so, no consumptive patient ought to die, for every consumptive patient has at one time or other some amount of inflammation in his lungs. I have elsewhere[†] adduced reasons for concluding that inflammation is the worst thing that can happen to a tuberculized lung; and I only allude to it here because such pseudo-scientific views as the above, when promulgated amongst the public, are injurious.

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[*] In the 'Annual Address in Medicine,' delivered before the British Medical Association in 1853.

[†] In an Essay on the 'Destructive Course of Pulmonary Tubercle,' with illustrations; in the 'British and Foreign Medico-Chirurgical Review' for October, 1855.

Now the three requisites I have named for the proper treatment of consumption are all met to a considerable extent by the climate of Torquay. For the first, it tends to allay existing excitement, and to avoid additional irritation, of the lungs. For the last, it tends to render the circulation fuller and slower. Has it then, in regard to the second requirement, any counterbalancing bad influence upon the general health?

Seeing from what has already been said that the state of the lungs usually improves, we might at once answer in the negative. But the case will admit of more than this negative support. A consumptive patient is weak; we seek to strengthen him. On what does his debility depend? A consumptive invalid is kept feeble chiefly by the feverish excitement of his complaint; this it is which impairs his appetite, breaks his rest, and thins his body. And this feverishness is sympathetic of, that is, it arises from and depends upon the active irritation going on in the lungs. Allay the latter, and the former abates. And with the diminution of feverish excitement, sleep and appetite, and eventually strength, return. Precisely, therefore, in so far as the climate proves soothing to the lungs, will it also prove beneficial to the constitution.

It is also to be observed, that from its calmative influence over the digestive organs and the nervous system, Torquay permits a more tonic plan of treatment to be adopted and a more generous diet given than can at all times be judiciously used elsewhere. We find that such tonic medicines, for instance, as iron and quinine, can be taken, when here, by persons who could not bear them before.

That there is something especially soothing to the respiratory organs in the air of Torquay, is well tested by the sensations of any one who, whilst temporarily suffering from bronchial irritation in severe weather, is obliged to leave Torquay for a day or two and travel to a distance. The comparative harshness of the air at a distance, the agreeable softness of that of Torquay on returning, are very striking under these circumstances, and carry conviction to the mind of the individual himself more forcibly than any meteorological statements could do. Patients frequently remark that they can take in a deeper breath here than before they came. It is probable that this is the fact. When the nerves of the lungs have been rendered unduly sensitive by disease, a sharp air irritates them; the irritated nerves in turn irritate the muscles which contract the bronchial tubes,* and thus the lungs do not take in as much air at each inspiration, or keep in what they do inspire so long, when the air is harsh to the sensations, as when it is soft and smooth. Nor is this, by any means, only a question of ease to the invalid. The more the as yet unaffected parts of the lungs are expanded at each inspiration, so long as no irritation is induced, the less likely is the disease to extend to them. The importance of this is obvious when we consider that a consumptive patient becomes dangerously worse chiefly in consequence of fresh tubercle forming in new portions of the lung, which were previously unaffected. The first step towards this extension of mischief is, that the fresh portion of lung ceases to perform its function efficiently; the next is, that a certain form of local atrophy, which indolent performance of function has a tendency to induce in every living structure, attacks the air-cells; and then comes tubercle. To prevent this chain of evil, the unaffected part of a consumptive lung should not be idle; and yet the diseased part should be kept as much at rest as possible. How to fulfil these opposite requirements is one of the great difficulties we have to contend with. But the difficulty is lessened when the air inspired is so soothing as to tempt (so to speak) the sensitive, but hitherto unaffected, parts of the lung to fill themselves freely.

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* See an Essay by the writer on the Bronchial Tubes, in the 'Trans. of the Provincial Medical Association' for 1851.

Again, it is most important that the circulation of blood through the minute vessels of the lungs should be free and easy and gentle. This, however, is impossible, unless the lungs can inspire with freedom, ease, and gentleness. For mechanical reasons, the vessels cannot otherwise transmit their contents; and on physiological grounds, the blood, on account of not being sufficiently purified by exposure to abundance of inspired air, refuses to move on properly. Under these circumstances a state of congestion ensues. Now nothing can more actively promote further tuberculization of the lungs than a combination of these two conditions of partial inaction and partial congestion. These dangers are, if not obviated entirely, at least much diminished by the invalid having always an unirritating air to breathe.

It is a fact in physiology, which every one should know, that the blood refuses to move properly through the lungs unless it has been sufficiently ventilated by fresh air.

But whilst the portions of lung which are yet unaffected should continue to perform their work gently but fully, still the less the demand upon the diseased organs as a whole, the better. However well the sound portions may discharge their office, the affected lungs are necessarily incapacitated for doing as much work as they could do when they were healthy throughout; and therefore, although breathing must go on, it is an advantage to throw as much of the work of the lungs upon other organs as possible. The main duty of the lungs (it has others which are subsidiary) is, to remove carbonic acid from the system, and to take in oxygen. In the taking in of oxygen, it is almost alone,—the skin to a very trifling extent in man assisting. But in purifying the system by giving out carbon, it is during perfect health assisted by several organs, chiefly by the liver, the skin, and the intestinal mucous membrane. We cannot cause these organs to perform the office of the lungs as suppliers of oxygen, but as purifiers from carbon to some extent we may. By placing a pulmonary invalid in an air which is warmer and softer than that to which he has hitherto been accustomed, we invite the liver, the skin, and the digestive canal to do more than heretofore of the work of depuration, and the lungs to do less. And in proportion as these several organs respond to the invitation, will the irritable lungs be spared.

But is not the liver apt rather to become sluggish and to refuse its work? From time to time undoubtedly it has this tendency,—a proof that it is more taxed than formerly. And this is the penalty we have to pay for the advantage gained. It is good for a consumptive invalid to reside in a locality where his liver is prone to become sluggish from over-work, though it would be very undesirable to neglect to rectify the biliary congestion which may occasionally arise in consequence of this.

The effect of Torquay upon the skin is very marked. The skin becomes soft, supple, and as smooth as velvet. And the circulation through the whole of the extensive network of blood-vessels beneath the skin is free and abundant, giving to the twenty-eight miles of cutaneous draining tubes full scope for duly discharging their functions.* There results from the general afflux of the circulating fluid towards the surface of the body an appearance of embonpoint, which perhaps has some connection with the notable lastingness of beauty in the ladies of Devon. This is not a land for wrinkles, and ladies from less-favoured regions would be surprised at the power of endurance of beauty here, and at the fresh comeliness of old age. Compare a lady of thirty-five in New York with one of the same age in Devon!

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* On 'Healthy Skin,' by Erasmus Wilson.

But if feminine beauty lasts long in this climate, there is one effect often noticeable especially in men which does not add to good looks—a certain puffiness of the eyelids, which vanishes on leaving the neighbourhood, not affecting the man of firm texture and hard constitution, but not uncommon in others. A medical friend, now practising in another part of the coast in this county, informs me that he never staid for a day or two at Torquay without finding his wrists a little less free than usual on awaking in the morning, from similar slight puffiness there.

Invalids who bring pink cheeks with them usually become paler at Torquay; and a florid complexion is not the most common sign of *bien être* amongst the residents. There are many persons in perfect health and firm condition who still do not present much ruddiness of face. Nor, when one calls to mind the spindle-shanks and rubicund visage of the old weather-exposed stage-coachman, will the presence of ruddiness necessarily imply health, or its partial deficiency the reverse. An invalid here, whilst gaining in flesh and filling up in the face, often excites the anxiety of his friends by looking paler than before. This is but an effect of the beneficial soothing influence of the climate, and yields, as strength returns, to a hue more indicative of health.

So important is the advantage of this habitual tendency to fulness of the integumentary capillary blood-vessels in drawing away the blood from the lungs and other internal organs, and thus relieving internal congestion, that some authors are disposed to refer all the benefits of a residence in a mild climate in a case of pulmonary disease to the effect produced upon the skin. From this view, however, I must entirely dissent. The mucous membrane is an internal skin, and participates in the advantages quite as largely as, and, from its greater delicacy, more importantly than, the external skin. Both are influenced beneficially, and the pulmonary affection partakes of the double benefit.

One very important office of the lungs is, by the introduction of oxygen, to minister to the production of animal heat. When a portion of the lungs is diseased, this function, together with the others, is impaired. A consumptive invalid is always starved and chilly in cold weather, unless, indeed, he be flushed by fever. A certain amount of heat is as necessary for the due working of a living being as it is for the due working of a steam-engine. Heat, therefore, must be made, or the person would die. And in many localities consumptive patients do die from mere cold long before their disease would in any other way attain its fatal termination. When any organ in the body acts, its texture undergoes a change, and heat is generated and substance lost. In a healthy person this is the natural and fit mode by which, when chilly, he makes himself warm. Cold is Nature's indication that he ought, if possible, to be exerting himself in some way. Exertion is Nature's remedy for cold. But a consumptive invalid is not able to exert himself to a sufficient extent to supply the necessary warmth. He has more of coldness to overcome, and less of both energy and substance to overcome his coldness with. His thin and feeble body can ill afford the material to be burnt up for supplying him with as much self-made heat as his system requires. But he cannot escape. Nature will have heat as long as possible, and when the air is too cold Nature insists upon a more active manufacture of heat within the body, and obtains it by means of the oxidation, that is, by the actual slow combustion of the body itself. To avoid the loss which this entails, in cold weather people eat more largely of heat-producing food; put more oil into their lamp of life; the oxidation then affects the elements introduced as food, and spares the constituent parts of the organized body. So long, therefore, as a consumptive invalid can take in and digest suitable food enough both to repair the waste of his body and also to furnish material for producing as much heat as he requires, for so long he does not suffer from cold air in so far as want of warmth is concerned, though he may suffer from its irritating influence on his chest. But how many consumptive patients are there whose digestive power enables them to do this? With all the help of cod-liver oil—an oil which has already been digested by an animal's liver, and is therefore more easy of assimilation by man than any other—there are not many consumptive persons who can eat and drink sufficient to maintain warmth without loss of substance. Generally, in a cold air, the consumptive invalid becomes rapidly thinner, in order to keep himself moderately warm. His own body is literally being consumed to keep him alive! In a mild climate the invalid is spared much of this. The external warmth of the air prevents the loss of his own natural heat from being rapid; the demand for internal heat-making is less; consequently the using up of his body's substance is less; he has more comfort and less wasting. A well-known magistrate here expresses all this very pithily. "At Torquay," says he, "the mild air wraps round a thin invalid like a warm blanket; and it takes so little out of him." That is the exact truth; it does save substance and strength by "taking so little out" of a consumptive person.

At the same time, it would be a great error to conclude that because a consumptive patient should be placed in a climate which spares him all undue expenditure of his body's substance, he ought therefore to take as little muscular exercise as possible. It is true that muscular exercise uses up muscle; but it is also true that muscular inaction wastes it faster still. In the machinery of animal life the main condition of strength is—*Exercise within the limits of power.* This is a grand distinction between a divine machine and a human machine. The one wears out by use: the other does so too at its appointed time; but it inevitably wears out most speedily by disuse. The human machine, moreover, is self-repairing. When out of order, it is through the changes induced by exercise that it regains its proper condition. All medicines act either by repressing the irregular exercise of an organ, affording Nature the opportunity of restoring the regularity of health; or by exciting an extra-exercise of some one organ or of several, under the changes of which Nature may reassume the correct mode. Practical medicine is but the handmaid of Nature.

The consumptive invalid needs strength. For the purpose of strengthening his weakened lungs in common with every other organ in his body, for the purpose of obtaining a healthy appetite for food and a healthy digestion, for the further purpose of brushing away the cobwebs from his mind, and of obtaining a natural desire for sleep, the consumptive person should make a habit of taking as much exercise *as he is able*. If the weather forbids him to leave the house he should take exercise in-doors. Out-door exercise, however, on every account is far preferable. The fresh air of heaven, balmy and gently exhilarating, refreshes the spirits; the ever-changing face of Nature, where every change, as in this neighbourhood, discloses a fresh beauty of combination of shade and colour, agreeably occupies the mind and distracts the thoughts from dwelling on ever-present ailment; whilst the sight of other invalids is far from adding to despondency. I question, indeed, whether there be not an ill-defined relief to the feelings in the sympathy instinctively felt between different invalids—strangers in intercourse, but akin in their illness.

It is, therefore, a special advantage of Torquay that it allows a consumptive invalid to take out-door exercise very constantly throughout the winter. And the winter here is short; it arrives so late, and spring so early, as constantly to excite remark,—particularly amongst those who come hither from Scotland.

Is there not a contradiction in advocating for a consumptive person at the same time a mild climate, because, amongst other effects, it saves him from expenditure of substance; and a habit of taking exercise which will occasion him expenditure of substance? The difference is, that the expenditure from the process of heat-making in a cold climate is constant and cannot be escaped, and is, therefore, an exhausting process: whereas, the expenditure from taking *a proper amount* of muscular exercise is a demand which is made only as often as it is necessary for the due renovation of the body's structure. In the one case, a man is spending a week's income every day. In the other, he ought to be only expending *rather less than the full amount* of his day's income every day.

What, then, is the measure of a proper amount of exercise? The real ability of the invalid. But a patient will often say, "I am already fatigued before I start!" That feeling, however, usually is not real fatigue, but only a listless indisposition for exertion—not fancied, very real indeed—yet such as exercise will remove—just as exertion removes ennui.

The feeling of good health arises from a consciousness of the aptitude of every part of the body to do its duty if called upon. To fit any organ for discharging its function properly it must receive that universal stimulus—oxygen. During an hour of cheerful hilarity, of agreeable and lively conversation, of moderate singing, of brisk walking, or pleasant horse-exercise, all parts of the body will have more oxygen conveyed to them than during half a dozen hours, perhaps, of quiescence. Hence, for a sound man, exercise, good spirits, and temperance in all things, are the tripod of health. And for a consumptive person all these things are useful, provided they be taken only within the limits that are safe. Advocating, then, very strongly the habitual taking of a *proper* amount of exercise, I have yet seen too much harm result from a consumptive invalid attempting to exceed a proper amount of exercise, or from a too vigorous attempt to over-tax the strength in the manner of taking it, to omit a word of caution. Consumptive persons are often endowed with a degree of natural liveliness which prompts them when they are improving in strength to forget that they really possess more spirit than force, more energy than power of endurance. How much exercise will be judicious, and with what amount of energy it should be taken, are questions that must be decided differently for every individual, and for which no general rule can be given.

I may mention, however, by way of caution, two examples of injury from over-energy.

A consumptive gentleman, who was doing well, rode a hard-mouthed pulling horse, which gave him much trouble to hold in. On his return he broke a blood-vessel, and, though living now, has never had the same amount of health since.

A consumptive patient should avoid gymnastics, a pulling horse, rowing a boat, and running up-hill; and, in a word, everything which causes him to be distressingly out of breath.

A young clergyman who had ruptured a blood-vessel two years previously, gradually recovered from this, under the care of Dr. Swayne and Dr. W. Budd, of Bristol, but was left thin and with symptoms of consumption. Dr. W. Budd sent him to Torquay to spend the winter of 1854-5. He improved in flesh and gained so much in feeling of strength that, during the dry, bracing east-wind weather of February, he could not be dissuaded from taking over-long walks, and from walking with over-quickness of pace. Returning from church very briskly one day, when the east wind was trying, he broke a blood-vessel in the lungs when arrived just at his own door. The attack proved unusually severe, and the loss of blood very great and repeated. From the effect of this the patient never recovered. An amount of mischief in the lungs resulted, which permitted no hope of ultimate recovery. In the early summer he left Torquay, advised by me to take a voyage to the West Indies and back,—for which his strength seemed to be adequate. I may narrate the sequel, although not pertinent to the question under consideration. Instead of taking the voyage, my patient was attracted by an advertisement, which for years has constantly appeared in all the newspapers, testifying to the extraordinary talents of a practitioner in London; and as Dr. W. Budd and Dr. Swayne could give him no encouragement as to the result of his disease, he went up to town in August, and placed himself under the care of the advertising individual. Informed in the usual way that he might be cured by pursuing a course of inspiring through an ivory tube, &c., and told from time to time that, by this process, "the air-cells were expanding and the cavities healing," and that his amendment was very satisfactory—he died in the ensuing November!

The following is a more cheering narration, and illustrates the benefits of mere exposure to sunshine and fresh air, even without exercise. A lady, now between fifty and sixty, thin and wiry, and having a slight dry cough when she unusually exerts herself, gave me this history of herself. At the age of seventeen she had cough and expectoration of blood and night perspirations, and became much emaciated. She was considered to be dying of consumption. Ascertaining that her medical attendants expected no better result, she entreated her father to let her be carried up to the top of the Worcestershire beacon, there to be laid on a feather bed (being too weak to walk about), and allowed to read all day. This plan was adopted every available day during an entire summer. In addition, she partook freely of neat's-foot oil. She regained an amount of health which permitted her to perform the duties of a very active life. This case is well known to Mr. Carden, of Worcester.

As a consequence of the feverish excitement of their complaint, consumptive persons are often excitable; and even when placid and most amiable, as they generally are, too energetic for the moment in their feelings and actions. To calm the nervous system without depressing the vital powers is of course desirable. Practically it is found that whatever does calm the nervous excitability saves the strength; and that whatever depresses the strength increases the nervous excitability. The calmative influence we require is possessed to a remarkable extent by the climate of Torquay. An individual of high intellectual position, when mentally overworked in London, is always told by his physician to go and "calm down at Torquay." I do not mean to say that relaxation at the seaside elsewhere would not act in a somewhat similar manner; but the air of Torquay is especially calmative to the nervous system.

The influence of sea-air must not be omitted as one of the remedial agencies of Torquay, in cases of pulmonary delicacy. Knowing how beneficial a sea-voyage sometimes proves, and how rare a disease comparatively consumption is amongst seamen afloat, it is strange that there should be a disposition in some medical authorities to undervalue proximity to the sea; and even sometimes to affirm that an inland locality equally mild would be preferable. In the first place no inland situation equally mild is to be found. But if it could, I doubt its proving equally beneficial. So specific an agent as the sea-air is not likely to be unimportant. It must be either positively an advantage, or the reverse; and that it is not prejudicial common experience proves. Consumption is a disease of lowered vital power. In all other affections of lowered vital power, sea-air to one who was previously a stranger to it, as a rule (though not without some exceptions), proves restorative. Reasoning from analogy, therefore, it should prove useful to the consumptive. And in consumption there is almost always a low form of inflammation present around the tubercles in the lungs, which the chemical constituents of sea-water, and consequently of sea-air, so far as it contains them, have a remedial efficacy in lessening. From such considerations beforehand we should have a right to anticipate that the seaside would be useful to the consumptive. And experience serves amply to support the conclusion. After an extensive survey of climate, in reference to pulmonary consumption, Dr. Thompson thus sums up: "In the temperate zone at least, the circumstances which characterise those climates that exercise the most beneficial influence are a temperature equable or limited in its range, and an atmosphere holding in suspension a considerable quantity of saline moisture."*

Torquay within the hills is very peculiarly immersed in sea-air. It is like a great ship without its motion. Owing to the complete screen which shuts it in on every side but that which opens towards the water, and owing to the absence of tidal reflux in Torbay to any distance, the air in Torquay proper is much more a sea-air undiluted than is the case at any other seaside town with which I am acquainted.

The only objections which I conceive could be brought against the seaside are,—first, that the winds at most seaside places are more boisterous than they are inland; secondly, that sea-air has a tendency to make persons not accustomed to it bilious; thirdly, that in a few individuals it does not, when undiluted, suit the respiratory organs.

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* 'Medical Gazette,' 1851, p. 230.

As regards Torquay, the first objection does not in its objectionable sense apply, since defence may be obtained from every strong wind; and the only turbulent wind to which the town is exposed is the south-west. Now so warm, even when most boisterous, is a south-wester at Torquay, that in the month of December every bed-room I entered during the prevalence of the storm of December 6th and 7th, 1856, had been, without a fire, not lower than 60° throughout the night.

The second objection is a real one as far as concerns invalids who suffer only from an enlarged and sluggish liver without any delicacy of the respiratory organs; but, as already explained, it is no disadvantage whatever to the consumptive invalid.

Of the third objection the following is a marked example. A lady from Lancashire, who had been a patient of Dr. Simpson and of Sir James Bardsley, was directed to spend the winter of 1853-4 at Torquay. Arriving here, she placed herself close to the sea. In a few days I was called to see her, and found her in some distress of mind from the fear that she must immediately leave Torquay, as she could not breathe with any comfort. She felt as if she could not "get her breath," and had passed wretched nights and anxious days in consequence. Having brought her carriage and horses, and broken up her establishment in the North, her disappointment to think of leaving Torquay was the greater. As I had previously learnt from Sir James Bardsley, that he did not consider this lady to be consumptive, but to be suffering from dilatation of the bronchial tubes, with some amount of bronchial irritation and much general delicacy, the augmented difficulty of breathing was at once attributed to the air not suiting the nerves of the lungs. On inquiry, I found that this lady had experienced the same symptoms at Southport when lodging close to the sea, and had concluded in consequence that Southport did not agree with her. It was now pretty evident that undiluted sea-air was the enemy. But inasmuch as the case was one for which Torquay was peculiarly desirable, a trial was suggested of removing to a boarding-house, half a mile from the sea, for a day or two, by way of experiment. The experiment answered; the breathing here was easy. The lady now took a house part way up the Warberry Hill, distant a mile from the sea, and passed the winter better as she declared than any since the commencement of her delicacy; and did not once experience a return of the symptom which at first had so greatly disheartened her.

Besides the positive gain which a consumptive invalid obtains from wintering at Torquay; there is a negative advantage of not less importance, in the lessened liability to accidental attacks of inflammation of the respiratory organs; and in the milder and more tractable character of such attacks when they do occur.

"I shall recommend no particular place as a resort for consumptives," says Dr. Richardson, of London; "for I wish not to enter into disputation on this point. But here is the formula for an hypothetical consumptive Atlantis. It should be near the sea-coast, and sheltered from northerly winds; the soil should be dry; the drinking water pure; the mean temperature about 60°, with a range of not more than ten or fifteen degrees on either side. It is not easy to fix any degree of humidity; but extremes of dryness or of moisture are alike injurious. It is of importance in selecting a locality that the scenery should be enticing, so that the patient may be the more encouraged to spend his time out of doors in walking or riding exercise; and a town where the residences are isolated and scattered about, and where drainage and cleanliness are attended to, is much preferable to one where the houses are closely packed, however small its population may be."*

Should a consumptive invalid remain at Torquay for the entire year? There are exceptions, but as a rule he had better not. It is a double advantage for him to leave for June, July, and August. By this time, if he has spent the winter at Torquay, the digestive organs will generally show signs of deficient energy, for which a change to an inland situation is the natural and appropriate remedy. And the return as autumn approaches renews the original advantages of coming to Torquay. But there is a certain class of pulmonary invalids who derive the greatest advantage from remaining at Torquay during the summer, taking the opportunity to go frequently upon the water. These persons are usually such as are thin, not prone to nausea or diarrhœa, and possessed of a fair amount of digestive power.

Most of the non-invalid residents find it conducive to their health to absent themselves from Torquay for at least a month during the summer or autumn; not because Torquay is "so hot," but because it is enervating.

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* On the 'Hygienic Treatment of Pulmonary Consumption,' p. 275; 'Journal of Health,' October, 1856.

Still Torquay is exceedingly delightful in summer. As the nights in winter are milder in the direction of warmth, so in the summer they are milder in the direction of coolness. The same equalising influence of the sea governs both conditions. The summer nights at Torquay are always freshened by a cooling breeze from the sea, as the winter nights are warmed by a warming air from the sea. The air in summer is never arid and burning. We never feel parched and thirsty from the mere heat of the atmosphere. And many residents in consequence enjoy the climate in summer exceedingly.

For those pulmonary invalids who, having wintered here, are anxious to leave early, for example in April or May, it is advisable that they halt for a time at Clifton or Bath. Later on, any of the favorite *inland* places of resort are suitable—Malvern, Tunbridge Wells, Harrogate. A tour in Switzerland in July and August for those who can bear the fatigue, and who can eat sour bread without disadvantage, forms a useful and an agreeable change. In August, however, Lucerne, and also Baden-Baden, are about as relaxing as Torquay, without its evening freshness.

For those who can avail themselves of the comforts of a private yacht, or who can in any other way make excursions on the sea, sailing is very useful. But to leave Torquay directly for another place on the seaside, however different the kind of climate, is less advantageous for either invalid or non-invalid than to go to some place inland.

Torquay is a particularly safe place of residence for delicate children, but a change inland in the course of the summer is even more necessary for them than for adults.

As a rule, Torquay as a place of permanent residence suits persons of sanguine and bilio-sanguine and nervo-sanguine temperaments better than the lymphatic. It appears to suit all elderly people, whatever their temperament. There are many instances of longevity amongst the early comers to Torquay, viewing the town as of fifty years' growth.

So many instances have occurred of persons who, after being restored to a fair amount of health by a prolonged residence here, have left it on the assumption that further residence was no longer necessary, in which the result has been unfortunate, that I feel sure the point ought always to be deliberately weighed before it is carried out. It is always a trial for one who has spent several winters in succession at Torquay to leave it permanently, although a trial which many make, and make successfully.

CHAPTER V.

ON THE EFFECTS OF VARIATIONS OF WEATHER UPON INVALIDS AT TORQUAY.

The effect of change of weather on the feelings of persons in health is well known, and is the natural explanation of our English custom of making weather the common subject of opening conversation. A change from warm to cold, or more particularly from dry to damp, elicits toothache, flying pains, and springing corns; resuscitates old rheumatism, the aches of ancient bruises, wounds healed up, or joints once injured. An impending thunderstorm occasions various undefinable sensations, such as nausea, tension across the forehead, or congestive headache. A cold, damp, sunless day, saddens the spirits, impairs good temper, and lessens energy, as much as a bright frosty morning exhilarates the spirits, warms up feelings of charity and benevolence, and invigorates muscular power.

As a rule, the weather which is most agreeable is that which is most salutary. But it does not necessarily follow that a *continuance* of the same kind of weather will continue to be so.

A pulmonary invalid bears the same relation to a healthy individual that a sensitive plant does to a hardy shrub. He appreciates, in an exaggerated degree, all that ordinary persons experience from the weather. Like them, a gentle frost brightens, braces, and exhilarates him; and, like them, a soft moist wind renders him languid and feeble. But here the resemblance ceases. In the pulmonary invalid we have to consider the presence of an additional element, namely, an irritable state of the lungs. And on this account there are few consumptive persons who do not feel injuriously a prolongation of the frost which, at its onset, gave them the feeling of increased vigour; or who do not derive advantage from a continuance of the soft and moderately humid air, which at first seemed to enfeeble them.

At Torquay the weather is more immediately dependent on the quarter from which the wind comes, than in inland places which are less under the direct influence of the sea. In summer, our finest weather is when the vane goes round with the sun, pointing east in the morning, south at noon, and west in the evening; and when, of course, the movement of the air is very gentle. In winter, the south and west, and south-westerly winds are all soft and warm; the south and west are ordinarily gentle; the south-west wind is also gentle when the weather is fine and steady, but when it first sets in after the wind has been for some time north of west, and at the period of the equinoxes, it is noisy, boisterous, wet, and warm. The north wind here, as elsewhere, brings frost, which, as tempered by the Torquay climate, is mild, fresh, and exceedingly enjoyable. It does not, in most persons, chap the lips or hands. The moment the wind changes to the southern hemicircle of the compass the frost vanishes, as if by magic. We have no perceptible intermediate period of thaw, and escape all that chilly, damp, searching coldness which accompanies the absorption of heat from, and the contribution of moisture to, the air, during the melting of snow and ice. Strangers are much struck by this escape from the extreme unpleasantness of a lengthened thaw. The frost-bearing winds arrive later, the frost-removing winds arrive earlier than in inland parts, hence the frost is not only less severe, but shortened, so to speak, at both ends.

When the weather changes, the pulmonary invalid changes too. We have no such specifically disordering winds as the leste of Madeira, the mistral of Provence, the tramontanes of Nice, the bise of Switzerland, the sirocco of the Italian coast, or the harmattan of the African; and perhaps a strong and hearty resident at Torquay would ridicule the idea of our having any disordering winds at all. Invalids, however, do here, as everywhere else, clearly manifest certain effects from certain kinds of weather.

A gentleman who for upwards of thirty years had a very extensive medical practice here, has observed to me: "I always used to be amused when persons said to me, 'fine bracing weather this,—must be very healthy;' or 'very relaxing weather this,—can't be healthy;' for I always noticed that during this relaxing weather I had least to do. If patients felt languid, still their complaints were not worse. It is a safe sort of weather. But in the fine bracing 'healthy' weather I was sure to be the busiest. It finds out a patient's weak points."

During the last week in November and the first week in December, 1856, the weather throughout the country underwent extreme changes. In Great Britain at large, from being cold, damp, and foggy, it suddenly became intensely sharp, with falls of snow, and frost sufficient for the skaters. This lasted for about a week, and gave way to a storm of strong south-westerly gales, with thaw, rain, and warmth.

During this fortnight of extremes of weather, Torquay stands out to great advantage as compared with any other place, either in Great Britain or on the Continent, from which I have been able to glean information. This will appear from the following notes of the weather extracted indiscriminately from several newspapers:

North of Scotland, December 1st: The snow-storm still continues. In some places the snow is six feet deep.*—South of Scotland: Tweed frozen over from 1st to 6th December.

Derbyshire.—"There was an unprecedentedly heavy fall of snow in Chesterfield and the northern part of Derbyshire, on Tuesday evening (December 2d). The weather for several days previously had been excessively cold; and the canals and rivers were covered with ice of an average thickness of an inch and a half. Between five and six o'clock on Tuesday evening snow began to descend in heavy flakes, and the ground was soon covered. The fall continued throughout the night, and the ground, in elevated spots, is a foot deep, whilst in the lower situations the depth varied from a foot and a half to two feet. A warmer temperature prevailed on Wednesday, but the previous frost and great accumulations of snow have almost put a stop to all out-door employment."

Halifax.—"Up to Thursday night (December 4th) the cold was most intense, and the hills and the valleys were covered with snow. In the course of Thursday night a thaw commenced, and by Saturday morning the snow had all disappeared. On Saturday a heavy rain set in and continued until Sunday night, with few intermissions."

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* A person near Aberdeen, another near Montrose, perished in the snow.

St. Leonards, Hastings, December 3d.—"We have been having the coldest weather I ever remember at this place. The snow has been lying for three days on the Esplanade. To-day it is all gone, and the bright sunshine with it."

Brighton, December 4th.—"How can I describe the cold we have undergone this last week. It has been more than Siberian."

London, December 2d.—"The weather within the last few days has been intensely cold, with a sharp cutting wind. The thermometer at the Royal Society's Receiving House, on Sunday night (November 30th), stood at 20°, being twelve degrees below freezing point. Yesterday morning (December 1st) at 9 o'clock, at 26°, at noon 33°, and towards night it had again fallen below freezing point."

Northern Germany.—"The frost which has set in so early in England, has already filled the rivers of North Germany with ice. The navigation to St. Petersburgh is closed for the winter.

Vienna, December 6th.—"It has been snowing at Vienna without intermission for a whole week. In one night the fall was two-and-a-half feet deep."

Rome, November 30th.—"Now that I am in the Eternal City, I have seen nothing as yet, for the cold is so intense that I am afraid to stand in the churches."

Torquay, December 9th.—"The lowest temperature registered at Torquay has been 29° at Park Place, 28° at Cove House, 26° at the back of Higher Terrace; but the bright sunshine and calm air rendered the weather most agreeable; the extreme point registered of cold being occasioned by radiation, with white frost at night. The temperature has since risen to 60°, with gales from the south-west. The total fall of rain in November was only eight tenths of an inch."

To which I must add, that we had frost for four days only, namely, the last two in November, and the first two in December; that we had no snow, although we could see some on Hey Tor, fifteen miles off; and snow lay for three days an inch deep at Plymouth. At Teignmouth, only eight miles distant from Torquay, but separated from it by the range of high ground which encircles Torquay, snow fell to the depth of two or three inches.

Torquay and London during a period of fluctuating Weather.

TORQUAY.		Maximum Temp.	Minimum Temp.	Dew Point.	WIND.	WEATHER.
1856.						
Thursday,	Nov. 27	51°	43°	44°	N.	Very fine and showers.
Friday,	,, 28	51	29	48	N.N.W.	Rain.
Saturday,	,, 29	38	29	30	N.	Very fine; frost … … Calm bright frost; sunshine.
Sunday,	,, 30	40	28	28	N.	Very fine; frost … …
Monday,	Dec. 1	40	26	26	N.N.W.	Very fine; frost. Coldest day
Tuesday,	,, 2	40	29	30	N.N.W.	Very fine; frost … …
Wednesday,	,, 3	47	42	39	E.	Cloudy and showers.
Thursday,	,, 4	55	42	38	N.E.; S.	Cloudy; rain at night.
Friday,	,, 5	55	48	50	S.W.	Rain … … Severe gales. Warm, moist, and in showers.
Saturday,	,, 6	58	52	51	S.W.	Rain … …
Sunday,	,, 7	60	55	54	S.W.	Cloudy … …
Monday,	,, 8	58	53	54	S.W.	Cloudy and showers
LONDON.						
Thursday,	Nov. 27	48°	35°	38°	W.	Cloudy and rain.
Friday,	,, 28	40	30	28	W.	Overcast and foggy.
Saturday,	,, 29	36	24	26	N.W.	Overcast till noon.
Sunday,	,, 30	34	19	22	N.W.	Part of day overcast; part clear.
Monday,	Dec. 1	34	22	24	N.N.W.	Part of day overcast; part clear.
Tuesday,	,, 2	32	20	22	W.	Overcast.
Wednesday,	,, 3	38	24	29	S.W.	Snow, sleet, and rain.
Thursday,	,, 4	39	25	31	S.	Calm; rain.
Friday,	,, 5	54	37	47	S.E.	Squalls of wind and rain. A gale at night.
Saturday	,, 6	56	45	48	S.W.	Heavy gale. Rough showers of driving misty rain.
Sunday,	,, 7	58	50	50	S.W.	Clouds; gales; squalls of rain.
Monday,	,, 8	58	52	48	S.W.	Clouds; gales; squalls of rain.

EXTREMES OF TEMPERATURE

DURING A PERIOD OF FLUCTUATING WEATHER IN 1856.

	Nov. 27.		Nov. 28.		Nov. 29.		Nov. 30.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Torquay	51°	43°	51°	29°	38°	29°	40°	28°
Nottingham	43	29	37	25	36	19	35	18
Macclesfield	...	...	35	24	32	19	32	19
Chiswick, near London	50	24	40	19	37	16	35	14
Royal Observatory, Greenwich	48	35	40	30	36	24	34	19

EXTREMES OF TEMPERATURE—*continued.*

	Dec. 1.		Dec. 2.		Dec. 3.		Dec. 4.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Torquay	40°	26°	40°	29°	47°	42°	55°	42°
Nottingham	37	19	32	17	...	...	...	...
Macclesfield	27	18	28	16	35	27	30	13
Chiswick, near London	33	15	35	19	37	24	38	30
Royal Observatory, Greenwich	34	22	32	20	38	24	39	25

EXTREMES OF TEMPERATURE—*continued.*

	Dec. 5.		Dec. 6.		Dec. 7.		Dec. 8.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Torquay	55°	48°	58°	52°	60°	55°	58°	53°
Nottingham	...	...	...	...	...	...	...	...
Macclesfield	40	29	50	40	54	44	51	47
Chiswick, near London	...	...	...	...	...	...	...	...
Royal Observatory, Greenwich	54	37	56	45	58	50	58	52

During this fortnight we had an opportunity of observing at Torquay the effects produced upon invalids by greater fluctuations, and more diverse kinds of weather than it is at all usual to see in the same short space of time. It may not be uninteresting to read a few notes made on the influence of the sudden change to frost after the beautiful weather of November here, and of the equally sudden change from frost to the warm, wet, boisterous south-westerly gales.

On the morning following the commencement of the frost, and on the second morning after the setting-in of the south-westerly gales, I made the following observations on the effects which might be referred to the influence of weather on different patients.

Gentleman, æt. 21, suffering from pain after food, and atonic dyspepsia. No affection of the chest.

Frost. Better.

Gales. More dyspeptic.

Lady, æt. 45. Valvular affection of the heart; congestion of the lungs and liver.

Frost. Cannot keep comfortably warm; breathing more oppressed.

Gales. Is sufficiently warm; breathing easy; but feels nervous, agitated, wakeful, and has no appetite.

Lady, æt. 26. Consumptive disease in one lung. Not very thin.

Frost. Feels more vigorous. Cough not worse. On third day of frost, cough worse.

Gales. Cough better; breathing easier; is sleepy; feels low and depressed.

Lady, æt. 44. Consumptive disease advanced, together with valvular affection of the heart—a very unusual combination; thin and fragile.

Frost. Congestive pain in chest; cannot "get breath enough;" looks nipped in the face; feels somewhat cold; is threatened with dangerous sinking. Is not aware that the symptoms are due to cold. All the symptoms relieved by stimulants and by keeping the patient warm in bed during the continuance of the frost.

Gales. Cough and breathing better. Feels prostrate and without appetite.

Lady, æt. 60. Double bronchitis.

Frost. Cough, breathing and restlessness at night worse.

Gales. Altogether better. Cough and breathing easy.

Gentleman, æt. 59. Congestion of liver, with dyspepsia.

Frost. Much better.

Gales. Slightly more dyspeptic and less energetic.

Lady, æt. 20. Pale, languid, anæmie: not consumptive.

Frost. Feels better.

Gales. Feels more languid.

Perhaps a still better test may be found in the feelings expressed by a number of patients suffering from the same disease, but in different degrees of severity, and living under precisely similar conditions as to diet, warmth, and locality. The following observations were made on twenty inmates of the Torquay Hospital for Consumption, seven being males, thirteen females.

1. Samuel Cunningham, æt. 53; from Chippenham. In third stage of consumption.

Frost. Slept less, feels more chilly.

Gales. No influence.

2. Orlando Brown, æt. 32. Plympton, St. Mary. Second stage.

Frost. Better; breathing and cough better.

Gales. Not quite so well; pains in chest.

3. George Broadribb, æt. 40. London. Second stage.

Frost. No effect.

Gales. Rather better; less pain in limbs.

4. John Whitcomb, æt. 28. Ottery, St. Mary. Second stage.

Frost. Appetite better, but cannot breathe so well.

Gales. Breathes better.

5. James Hudson, æt. 22. Appleby, Leicester. First stage.

Frost. No effect.

Gales. Not quite so well; slight headache and pains in chest.

6. Henry Mudge, æt. 22. Mount Edgecumbe. Third stage.

Frost. No difference.

Gales. No difference.

7. Seymour Wilkins, æt. 17. Littleton, Wilts. Second stage.

Frost. No difference.

Gales. No difference.

1. Louisa Miles, æt. 29. Shrewton, Wilts. Third stage.

Frost. Better; cough and breathing better.

Gales. Not so well; weaker; breathing oppressed; pains in chest.

2. Ellen Spredbury, æt. 26. Dunington. Second stage.

Frost. Not so well; breathing and cough worse; more languid.

Gales. Not so well; cough worse; more languor and pain of chest.

3. Matilda Perry, æt. 17. Maningford. First stage.

Frost. Better.

Gales. Not so well; headache; breathing oppressed; palpitations and pain of chest.

4. Emma Davis, æt. 20. Marlborough. Second stage.

Frost. Breathing not so good.

Gales. Feels not so well; pains in shoulders and back; headache; palpitations.

5. Harriet Colmer, æt. 20. Whitestone, near Plymouth. Third stage.

Frost. Cough and breathing worse.

Gales. Breathing worse; more feeling of weakness and pains in limbs.

6. Matilda Ponsford, æt. 35. Devizes. Third stage. Disease extensive and advanced.

Frost. Breathing and cough worse. Sleeps badly.

Gales. Breathing and cough worse; pains in chest.

7. Fanny Burden, æt. 42. Marlborough. Second stage.

Frost. No effect.

Gales. Pains in shoulders and chest.

8. Jane Tidcomb, æt. 22. Farringdon. Third stage.

Frost. Worse; pain in left chest; breathing and cough worse.

Gales. Not so well; pains in limbs.

9. Ann Cleverley, æt. 13. Calne. First stage.

Frost. No difference.

Gales. Better.

10. Eliza Toplin, æt. 24. Devizes. Second stage.

Frost. Has cured her headache; no difference in any other respect.

Gales. Not so well; headache; breathing worse; pains of chest.

11. Ann West, æt. 32. Bristol. Second stage.

Frost. Better; stronger.

Gales. Not so well; weaker; headache; pains of limbs.

12. Jane Ford, æt. 24. Wilton. Third stage.

Frost. An attack of pleurisy; breathing difficult.

Gales. Breathing and cough better.

13. Mary Twine, æt. 24. Wooton Basset. Third stage.

Frost. Breathing worse; spitting of blood.

Gales. Chest-symptoms better; hæmoptysis stopped; feels more languid.

It is almost unprecedented to have an opportunity, at Torquay, of witnessing, in so short a period of time, changes of weather so disturbing in their character. The notes I have just given may, therefore, be taken as representing the worst face of this climate,—the reverse of the medal. As I have copied the exact words of the hospital patients, the language will be understood to express the impressions of the patient rather than the medical opinion of the writer. Indeed the memoranda were made at my request by the matron, in order to avoid the possibility of the error so easily committed by the physician of leading to a certain kind of answer by a certain mode of putting the question. This will explain, also, why the same patient is said to state that she is "worse" during both kinds of weather, whereas, in a medical sense, she is not seriously worse in either. Her meaning is, that to her own feelings she is not so well as usual both during the frost and during the prevalence of the south-west gales.

Frost and gales being exceptional, what is the typical winter weather of Torquay? The ordinary weather of winter is fine, bright, or clear, and gray, soft and mild; with a gentle movement of the air always going on, but without strong wind. And as a rule, this is the kind of weather during which the pulmonary invalids feel and are the best.

It has been asserted somewhat dogmatically, that "an enervating climate assuredly may produce such relaxation of the pulmonary mucous membrane as to occasion hæmoptysis." * Yet the same author elsewhere states,†—"Baiæ and Pozzuoli are strongly recommended by M. Carrière, as a winter residence for phthisical invalids sojourning in the Neapolitan territory. The climates of both these places of classic renown are mild, that is humid, warm, and less subject to the influence of violent winds than any place in the Campagna. The decrepit, shrivelled, and bent appearance of the wretched inhabitants along the shore at Baiæ, with the undrained swamps in the neighbourhood, are evident proofs against the salubrity," *i. e.* the *general* salubrity; but this does not affect the question as regards its suitability for existing consumptive disease—"of this place." But Pozzuoli is considered, by the same writer, to be free from any obnoxious influences; and he is surprised that a climate so mild, milder, indeed, as this writer says, than that of any other winter station throughout Italy, should have been hitherto overlooked. Renzi, a recent authority, mentions its beneficial influence in phthisis thus: "Consumption is specially benefited by this climate. It calms and assuages that complaint in a surprising manner, especially when it is complicated with considerable irritation of the mucous membrane of the air-passages and digestive organs. Farther, he attributes the virtues of the climate to a kind of combination of volcanic sulphur vapour with the mild atmosphere, which has a balsamic influence in diseases of the mucous membrane." M. Carrière goes even further than Renzi, seeing he states—"Le climat de Pozzuoli pouvant modifier favorablement les symptômes de la phthisie et même les faire disparaître."

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* Carrière, quoted by Dr. Burgess, on the 'Climate of Italy,' p. 159.

† Ibid., p. 202.

I much question whether any amount of warmth and moisture in the air ever did, or ever can, occasion expectoration of blood. Certainly at Torquay, we never have reason to ascribe an attack of hæmoptysis to the influence of atmospheric warmth and moisture. As spitting of blood, to a greater or less extent, occurs in the grand majority of cases of consumption at some period of the disease, we necessarily see a great deal of it at Torquay. Do we then see it most in the soft, humid, south-wind weather, or when the dry bracing north-east wind prevails? So notably in the latter, that I have been in the habit of expecting in the consumption hospital here, where diet and regulations being the same, there is less to complicate the observation, that when the March east winds set in, a certain number of patients previously free will begin to spit blood almost at the same time. So commonly has this happened, that perhaps in one week after the setting-in of the east winds, six or seven out of twenty patients not spitting blood before, will begin to do so together. It is no very rare occurrence for consumptive invalids who imprudently venture to church during the prevalence of the north-east winds, to be seized with hæmoptysis during divine service.

With some pulmonary invalids, the east wind disagrees from the first moment. With others, for the first day or two after the commencement of east winds, an increase of muscular energy impels, whilst a brilliant blue sky entices the consumptive patient to take out-door exercise. These days are complete invalid decoys. Against their temptations, warning is very necessary, but —seldom attended to. The use of the respirator does a good deal to lessen the danger, and proper attention to rendering the air in-doors warm and humid is very useful. But the bad influence of an east wind cannot entirely be obviated. It will affect the quality of the air, however defended the locality may be from the direct blow of the wind.

The easterly winds may last a week, and many invalids here feel scarcely the worse; two or three weeks, and hardly a single pulmonary patient escapes more or less increase of his distressing symptoms.

A congested state of the mucous membrane, whether of the throat, air-passages, or digestive canal, usually proceeds from one of two causes. The one is,—irritation of the surface itself, as from gluttony or intemperance. The other is,—some obstacle to the free return of blood from it, as in the case of disease of the lungs, heart or liver, in which the circulation of distant parts is always more or less obstructed. When both these causes are absent, no amount that is ever found in Nature of mildness with insensible humidity of the atmosphere ever induces congestion of a mucous membrane. A cold damp air may, but a warm humid air does not. On the contrary, when such congestion of a mucous membrane is present, such an air, partly by assuaging the disorder on which it depends, partly by promoting the secretion from the congested surface which is Nature's mode of relief, does very much towards removing the congested condition.

How desirable it is for the purpose of allaying irritation in the chest, that the air should possess a sufficiency of moisture is seen in the irritating influence of a continuation of easterly winds, or of the air in an apartment heated by a closed metal-stove; the air in both cases being unpleasant to the sensations, and prejudicial, partly because it does not possess sufficient moisture.

During the prevalence of east wind, all affections of the respiratory organs are benefited by adding steam to the air. Dr. William Budd found, at Bristol, that he thus rendered that severe inflammation of the windpipe—Croup, far more amenable to medical treatment. Examples of the harm resulting from imprudent exposure to east wind in pulmonary complaints are too familiar to require illustration. For the purpose of adding a practical remark, I will, however, adduce one example: A Worcestershire gentleman, æt. 32, who had been considered by Mr. Carden, to be in a precarious state for two years past, came to spend the winter of 1854-5 at Torquay. He could not be persuaded to treat himself with suitable precaution, and one east-wind-day, he persisted in sitting for an hour on the Beacon-rock. The immediate result of this was a severe attack of pleurisy on the side on which the greatest amount of pulmonary disease existed. His prostration was extreme, and he died at the end of a week, immediately after eating an over-large quantity of strong soup. I saw him, in consultation with Dr. Francis (now of Northampton), who has directed attention to the circumstance of the danger to a patient with very reduced powers of life of *overfilling the stomach with food at one time.** The enfeebled heart is oppressed; and the lanquid nervous system incapable of affording the requisite energy for safely digesting the extra quantity of food; the patient becomes faint and dies. Ordinarily Nature prevents this evil, by removing all inclination on the part of the debilitated invalid to take in too much food of any kind, but as in the above example, there are some exceptions.

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* Francis on 'Sudden Death.'

" Those who have visited, in the winter or the spring, cities on the continent which are remarkable for the dryness of the air, such as Madrid, describe the discomforts arising from the drought as being distressing, and the extent of disease of the lungs as being dreadful. Whether, therefore, we regard the most enjoyable season of the year at inland places, or the places to which the healthful or the invalid resorts, or the prevailing conditions on a sea-voyage, we shall observe that one uniform characteristic of the air is moisture. It is, therefore, a necessary inference, that when we make in our rooms an artificial summer temperature, we should also provide for a summer humidity. Now it happens, owing to the generally moist climate of the British Isles, that the air at comparatively low temperatures is so saturated with moisture that it still contains sufficient humidity. But in mid-winter, with frost or an easterly wind, it is essential that the air be provided with a liberal supply of moisture."*

Dr. Lombard, of Geneva, after enumerating the circumstances which most strongly oppose the progress of pulmonary consumption, thus concludes—"Of these, the most important is the moisture of the surrounding atmosphere."†

Mr. Martin, in his recent work on 'Tropical Climates' (p. 42) thus expresses himself: "The consideration of the effects produced by migration, during a state of disease, from a cold to a warm and moist climate," says Dr. Copland, "is of the utmost importance. Keeping in mind its influence on the healthy frame, chiefly in exciting the functions of the skin and liver, and diminishing those of the lungs, we are led to prescribe it in various diseases. In hæmoptysis this change is obviously beneficial, especially as a warm and moist atmosphere, by this mode of operation, lessens the activity of the pulmonic circulation, and the disposition to sanguineous exudation from the surfaces of the bronchi; bronchitis and tubercular phthisis are also often benefited, and the progress of the latter much delayed by this change of atmosphere, especially when adopted early."

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* 'Edinburgh Medical and Surgical Journal,' 1836, vol. xlv, p. 159.

† On the 'Warming, Ventilation, and Humidity of Rooms;' by Francis Lloyd, 1854, p. 47.

Nor are these opinions, founded as they are on mere medical observation, unable to bear the test of the observations of that most unprejudiced of all observers, the Registrar-general. "During the weeks of the greatest and least mortality from phthisis, in the year 1854, we find that the air was, on the whole, drier when this disease was most fatal. * * * A south-west wind has evidently the effect of keeping alive many consumptive patients that a north-easterly wind would prove fatal to; and in order to show how much influence these two winds have upon the bills of mortality, as regards phthisis, we will place the statistics in a tabular form." (A table is here given showing that the greatest number of deaths from consumption, in 1854, occurred when the air was driest, and the winds north and north-east.) "On referring to the table of deaths from pulmonary diseases for 1854, it will be seen that there is generally a diminution in the number of deaths from phthisis after a week or two of great mortality. This might be due either to the killing off by the north-east winds and their concomitant dry air, of the worst cases, or else to the preservative effects of the south and south-west winds, which, with the increased moisture of the air, seem to accord to these poor sufferers an extension of their existence, until their benign influence is checked by a change in the weather." (A table is here given showing that the fewest deaths from consumption in 1854 occurred when the air was most moist and the winds south-west.) "We believe," adds the author, "that the above facts are in accordance with the experience of most physicians; and it must be acknowledged that in the treatment of a disease unfortunately so common in our country, every circumstance that seems either to mitigate or aggravate it ought to be well known; for without such a knowledge it will ever be impossible to treat phthisis scientifically."*

Enough, perhaps, has been adduced to show that, of the two extremes, it is better for a consumptive invalid that the air should be too moist, than too dry. There are evils connected with both extremes, but these are greater when there is excess of dryness.

At Torquay, during a frost, there is more humidity in an insensible shape in the air than in London, although the chilly damp fogs of the metropolis would lead to a different inference. The explanation is simple. Warm air will sustain more moisture in an invisible form than cold air. The air of Torquay being relatively warmer than that of London, sustains its humidity in an invisible shape; whilst the colder air of London precipitates its moisture in the very sensible and visible condition of fog.

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* Haviland on 'Climate, Weather, and Disease,' 1855, p. 24, et seq.

We may test the correctness of this conclusion by comparing the four days of frost at Torquay, in November and December, 1856, with the same days in London:

1856.	Mean Temperature.	Mean Dew Point.	Difference between Mean Temperature and Dew Point.	Minimum Temperature.	Difference between Minimum Temperature and Dew Point.
November 29. Frost:					
Torquay	33°	30°	3°	29°	$\frac{0}{1}$*
London	29	26	3	24	$\frac{0}{2}$
November 30. Frost:					
Torquay	34	28	6	28	$\frac{0}{0}$
London	28	22	6	19	$\frac{0}{3}$
December 1. Frost:					
Torquay	33	24	9	26	$\frac{2}{0}$†
London	29	24	5	22	$\frac{0}{2}$
December 2. Frost:					
Torquay	34	30	4	29	$\frac{0}{1}$
London	27	22	5	20	$\frac{0}{2}$
December 3. Wet:					
Torquay	44	39	5	42	$\frac{3}{0}$
London	31	29	2	24	$\frac{0}{5}$

* $\frac{0}{1}$ means that the minimum temperature was one degree lower than the mean dew point.

† $\frac{2}{0}$ means that the minimum temperature was two degrees higher than the mean dew point.

It will be seen that the difference between the dew point and the mean temperature (which marks the *sensible* dryness of the air) is the same on November 29th and 30th. But Torquay had, nevertheless, more of *insensible* humidity, on the 29th by 4 degrees, on the 30th by 6 degrees, namely, the difference of the dew point at Torquay and the dew point at London: just as its mean temperature was on the 29th, 4 degrees higher; and on the 30th, 6 degrees higher than in London. Hence, during the frost of these two days it was less cold and less dry than London, although marking the same amount of *sensible* dryness, as seen by the bracketing. On December 1st, Torquay marks 9° of dryness to 5° of London. Yet it had not really a less humid air, but just the same, 24° for each being the mean dew point. But the mean temperature at Torquay being 4° higher, elevates the *sensible* dryness in the scale. On December 2d, London marks 5° of sensible dryness, against 4° at Torquay, *i. e.*, Torquay had one degree more of *sensible* humidity than London, but of *insensible* humidity, it had 8° more. On December 3d, Torquay marks 5°, against 2° of *sensible* dryness, *i. e.*, it was 3 degrees dryer than London in sensible humidity; but in *insensible* humidity it was 10 degrees moister, as also in mean temperature it is 13 degrees warmer.

Consequently, taking this short frost as an average specimen of Torquay weather during frost, we may state, that during a frost at Torquay, the air is less cold and *less deprived of its latent humidity* than it is in London. This cannot be imitated by artificially warming apartments, and is, doubtless, a main reason why frosty weather at Torquay is so agreeable, and why it fails to irritate the skin. And if there be any soundness in the several medical opinions quoted, any accuracy in the observations stated, or in the inferences deducible from the returns of the Registrar-general, such a modification of frosty weather must be advantageous to the pulmonary invalid.

CHAPTER VI.

SKETCH OF THE GEOLOGY OF TORQUAY.[*]

The rocks of Torquay and its neighbourhood are slates, limestones, greenstones, and red conglomerates and sandstones.

In Torbay the conglomerates and sandstones commence at Goodrington sands, and extend thence to the turnpike-gate under Waldon Hill, immediately west of Torquay. Here they come in contact with the limestones, which are continued along the coast to the western extremity of Meadfoot Beach, where they are found to rest *conformably* on clay slates, which extend to near Hope's Nose, the eastern extremity of Torbay, where a mass of limestone is met with, but is not of great volume, as almost immediately on the north-east of the point, slates reappear and continue, with occasional bands of limestone, to the small cove south of the Black Head, where they come in contact with greenstone—a well-known variety of trappean or volcanic rock. The greenstone is continued to the south side of Ansty's Cove, where it again meets slates and limestones, the former resting *conformably* on the latter, and extending thence to Oddicombe, a little beyond Babbacombe, where they once more come in contact with the red conglomerates, which are from this point continued along the coast eastward. The slates are not seen beyond the south side of Ansty's Cove until they reappear, under the limestones, mingled with trap, at Babbacombe Beach, whence they form the base of the cliff onwards to the junction with the conglomerate just mentioned; the junction of the limestones and conglomerates, south of Torbay, is along a line from the turnpike-gate, under Waldon Hill, skirting Tor on the south, and passing between Chapel Hill and the railway-station, and onwards to near Kingskerswell. On the north, the junction commences at Oddicombe Beach, skirts the grounds of Hampton House, runs through Marychurch, and passing east and north of the village of Barton, proceeds, also, towards Kingskerswell. Hence it will be seen that the Torquay district consists entirely of slates and limestones, and is surrounded on all sides by the red sandstones and conglomerates. Though, in some places, and especially between the Beacon

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[*] I am indebted, for this chapter, to my friend Mr. Pengelly, from whose pen a more complete work on this subject may shortly be looked for.

Hill and Meadfoot Beach, the limestones are very much disturbed, as is seen in the numerous foldings and contortions of strata, the entire mass may be said to dip, at a high and tolerably constant angle, towards the south; and, as no instance of unconformability between them and the slates is found, not only in this district but in the whole of South Devon, it does not appear that any important physical change occurred in this area during the era of their deposition. They are both, more or less, fossiliferous, but the limestones are probably richer than the slates both in species and individuals. Except in one doubtful case, every fossil found in the slates is also met with in the limestones; hence, they clearly belong to the same great Pre-Adamite Organic Period. Upwards of sixty genera, containing about two-hundred species of organisms, are met with in them, all of decidedly marine forms, and belonging to invertebrate animals. Sponges, corals, molluscs—both bivalve and univalve—and crustaceans abound; the masters of our ancient Devonian seas were certain inhabitants of chambered shells, allied to the modern nautilus and cuttle-fish, and known as Orthoceratites and Cystoceratites.

The palæontologist early recognised many of our fossils as identical with some belonging to the mountain limestone of the Carboniferous era;

others, but a much smaller number, were found in rocks of the Silurian age, and a third group were common to both Carboniferous and Silurian rocks; whilst more than a moiety were altogether peculiar to the rocks of Devonshire; hence it was inferred, that these rocks belonged to a period intermediate to the Carboniferous and Silurian eras, in other words, that they are the equivalents of the Old Red Sandstones of Scotland and Herefordshire. Recent discoveries have confirmed this chronology, notwithstanding the difficult fact that the Old Red Sandstones of North Britain are rich in fossil fish, whilst the South Devon slates and limestones have not yielded any evidence of the existence of Vertebrate animals of any kind.

Except in a very few instances, the slates underlie the limestones; nevertheless, they probably occupy the most elevated points in our district. Many of our hills consist entirely of them in finer or coarser varieties; locally some of them are known under the names of *Shillet* and *Dunstone.* The following are the principal slate localities, namely, Warborough Hill, Furzewell Hill, the high ground on Marychurch Road, Hesketh Crescent, and Lincombe Hill, and a part of Tor.

Limestones compose Waldon Hill, Tor Hill, Chapel Hill, Upton, Houndaway Hill, Happaway

Hill, the Braddons, Park Hill, Daddy's Plain, and Beacon Hill.

The greenstones of the Black Head are doubtless more modern than the slates and limestones, as wherever they are in contact, both the latter have been mechanically disturbed, and metamorphosed as if by the action of heat, both good chronological tests.

That the conglomerates are more recent still is seen in the fact, that they are entirely made up of limestone and trappean pebbles, both evidently derived from rocks of this district. The limestone pebbles contain fossils, all identical with those found in our limestone beds, but excepting these there are probably no fossils in the conglomerates. Their red colour is due to the presence of red oxide of iron, and, more commonly than otherwise, rocks in which this substance abounds, are remarkably poor in organic remains. By a very safe test—namely, that of continuity of strata—the conglomerates and sandstones are found to belong to the New Red Sandstone, or, as it is now more commonly called, the Triassic age.

CHAPTER VII.

METEOROLOGICAL OBSERVATIONS ON TORQUAY.

The materials employed in constructing the following tables are either simply copied, or else derived from Mr. Vivian's tables, as published in various forms in the 'Torquay Directory,' every week, month, and quarter, for several years past; and from the Reports published quarterly by the Registrar-general.

In a paper read before the British Association, at Cheltenham, in 1856, Mr. Vivian proved, from statistics based upon observations extending from 1842 to 1856, and from comparisons deduced from the returns of the last six years, that Torquay, as compared with the rest of England as a whole, presented the following peculiarities:

The mean *animal* temperature of Torquay was (omitting decimals) two degrees (F.) higher than that of all England.

The maximum temperature for the whole year was seven degrees lower.

The minimum temperature was twelve degrees higher.

The mean daily range of temperature was five degrees less.

The mean quarterly range of temperature was thirty-one degrees less.

The average number of days on which rain fell was fifteen days less.

The depth of rain was two inches greater.

The average quantity of vapour for the whole year was the same.

The additional quantity of watery vapour required to saturate a cubic foot of air was greater at Torquay by ·2 (Torquay, ·9; all England, ·7).

The average humidity of Torquay was ·6 degrees less (Torquay ·76; all England, ·82).

Mr. Vivian explained the principle upon which the cool summers and mild winters of South Devon and Cornwall are to be accounted for, by referring to the equable temperature of the sea by which the peninsula is surrounded. He had observed the surface water of Torbay to be as much as twenty-one degrees above the *minimum* temperature of the air in winter, and thirteen degrees below the maximum in summer. By the same cause, he accounted for the equable hygrometrical condition of the air; the temperature of the sea being frequently above the dew-point in winter, and below it in summer.

Torquay has the credit, with the world at a distance, of being warm and equable in winter. This it deserves. It has the discredit of being exceedingly hot in summer. This it does not deserve.

Torquay has the credit of being equable in its amount of humidity. This it deserves. It has the discredit of being considered a damp place. This it does not deserve. On the contrary, Torquay is one of the least damp places in Great Britain.

In proof of these assertions, I need only refer to the tables here subjoined. A period of twelve months is taken in consecutive quarters, from June to June, without any further selection than that of using a different year for each table, for the sake of variety and extent of observation. The daily 'Meteorological Journal' will show the weather for every day in one year, selected merely because the returns under the head of "Ozonometer" happened to be more perfect for that than for the other years which Mr. Vivian has tabulated.

As to temperature, the tables will speak for themselves. But respecting humidity, a word of explanation is necessary.

The quantity of moisture in the air at any given time, and the dampness of that air, are far from being the same thing. In summer, when the air is bright, clear, and dry, it in reality contains more moisture than in winter, when it *feels* more damp. The explanation is, that warm air can contain more watery vapour in an invisible form than cold air. So long as the watery vapour is invisible, and not perceived as moisture, so long the air is not *damp*. Moisture in this shape may be styled latent humidity.

But when the air is so full of latent humidity that the smallest lowering of temperature causes it to begin to be precipitated, the air is damp.

The measure of dampness then is the nearness of the watery vapour, which more or less is always present in the atmosphere, to the point at which it begins to be precipitated in a sensible shape. Consequently, the greater the removal from the point of saturation, the greater the dryness. The point of saturation is the dew-point. Hence the distance between the temperature of the air, and the temperature of the dew-point, is the measure of sensible dryness. An air with ten degrees between the two, is therefore drier than an air with nine degrees or any smaller number. But the sensible dryness is not always a measure of the real dryness. In a cold frost, the air may be saturated with moisture, but from its low temperature, it is a much drier air in its effect upon our bodies, owing to the circumstance that it requires to be much more warmed up when in contact with either skin or lungs than usual; and therefore the humidity which saturated it when at 32° is far from doing so when it has been raised up to 98°—our natural temperature. Hence a frosty air, though saturated with humidity, is always a dry air. Whilst summer air, which is not near to the point of saturation, is a much moister air, though its moisture is in a latent form. Consequently a place may, from being more uniformly warm, contain more latent humidity in its air, and yet possess a drier air, as regards freedom from damp or sensible moisture, than another which shall be damper, and yet possess less of actual humidity in the atmosphere.

The sensible dryness is measured by the number of degrees of difference between the mean temperature of the air, and the mean temperature of the dew-point.

The actual amount of latent humidity contained in the air, is measured by the number of degrees at which the dew-point stands. When the dew-point is high, the quantity of latent humidity is great, whatever the sensible dryness may be. When the difference between the mean temperature and the dew point is considerable, the sensible dryness is great, whatever the actual amount of latent humidity may be. But the converse does not hold good to our feelings, since when the difference at a low temperature (*e. g.* frost) is very small or none, the air *feels* dry; though in reality it is at, or close to, the point of saturation for that given temperature.

By comparing the degrees of dew-point in the Tables of Comparative Humidity, the amount of absolute moisture contained *in a latent form* in the air of the different places named for one year, from June 1852 to June 1853, will be seen. By noting the degrees of difference between the dew-point and the mean temperature, the sensible dryness will be obtained. The higher the figure of difference, the greater the dryness. The lower the figure of difference, the nearer the approach to dampness.

During this year (from June, 1852, to June, 1853), in respect to the degree of *sensible dryness*, Torquay was drier than—

Ventnor, in August, September, October, November, December, January, February, March, April, May, and June.

Was drier than London, in August, September, October, November, December, January, February, March, April, and June.

Was drier than Exeter, in August, September, October, November, and December.

Was drier than Manchester, in August, September, October, November, December, January, February, March, and April.

Was drier than Clifton, in January, February, March, April, and June.

Torquay was less dry than Ventnor, in July; than Exeter, in July; than London, in July and May; than Clifton, in May; than Manchester, in July, May, and June.

Between Torquay and Exeter the comparison is for the six months from July to December only; between Torquay and Clifton, for the six months from January to June, owing to the returns being deficient.

In respect to *latent humidity*, as measured by the height of the dew-point, Torquay had more than—

London, in September, October, December, May, and June.

Than Manchester, in July, September, October, November, December, January, May, and June.

Than York, in July, August, September, October, November, December, January, and May.

Than Clifton (for half year only), in January, May, and June.

Torquay had less than Ventnor in every month in the year.

Than London, in July, August, November, February, March, and April.

Than Manchester, in February, March, and April.

Than York, in March, April, and June.

Than Clifton, in February, March, and April.

A glance at the table will show the comparative dryness both as to *latent humidity* (by noticing the height of dew-point); and as to *sensible dryness* (by noticing degrees of difference) between the several places named, in respect of one to another, as well as to Torquay.

As a general inference, it may be stated that Torquay is quite remarkable for the amount of its *sensible* dryness: whilst of *insensible or latent* humidity, it has a sufficiency, but by no means more than several other places. Ventnor, for example, has been stated to be drier than Torquay; whereas, as here shown, Torquay for *every* month in this year was drier than Ventnor, in both *sensible dryness* and in having rather less of *latent humidity*.

It is to be remembered that latent humidity causes the air only to feel *soft*, not damp. The air is damp in proportion as the humidity ceases to be latent and becomes free; hence, in the middle of a hot day, the air is dry, though it contains much latent humidity ; when a cold evening succeeds, the air becomes damp because the previously latent moisture now is set free, as the cooled atmosphere cannot sustain it any longer in the form of insensible vapour. The absence of such evening cooling at Torquay thus explains the absence of evening damp and chill. Every one carries a hygrometer at his finger-end, by which he may roughly estimate the humidity of the air. If his nails are more dry, hard, and brittle than usual, the air contains more moisture, either latent or free, than ordinary. Ladies' tresses, and the state of the lips, furnish similar information.

COMPARATIVE HUMIDITY OF SEVERAL PLACES,

For One Year, from June, 1852, *to June,* 1853.

	Mean Temp.	Dew Point.	Difference.
July, 1852.			
Torquay	63·5	57·6	5·9
Ventnor	57·2	60·6	6·6
Exeter	64·7	56·3	8·4
St. John's Wood	66·4	60·2	6·2
Manchester	67·9	57·5	10·4
Nottingham	66·8	60·5	6·3
York	64·5	55·7	8·8
August, 1852.			
Torquay	60·7	53·2	7·5
Ventnor	63·3	59·2	4·1
Exeter	60·5	54·	6·5
St. John's Wood	60·9	56·7	4·2
Leeds	60·8	51·8	9·
Nottingham	61·2	54·7	6·5
York	59·1	53·	6·1
September, 1852.			
Torquay	57·4	50·4	7·
Ventnor	59·9	56·3	3·6
Exeter	55·8	50·	5·8
St. John's Wood	55·5	49·7	5·8
Manchester	54·3	48·2	6·1
Nottingham	54·7	49·4	5·3
York	53·	49·	4·
October, 1852.			
Torquay	50·5	43·6	6·9
Ventnor	51·9	47·4	4·5
Exeter	48·	46·9	1·1
St. John's Wood	46·2	42·6	3·6
Manchester	44·6	40·1	4·5
Alderley Edge	45·	39·8	5·2
Bowdon	44·5	39·7	4·8
York	45·5	41·6	3·9

	Mean Temp.	Dew Point.	Difference.
November, 1852.			
Torquay	50·5	43·8	6·7
Ventnor	51·9	49·7	2·2
Exeter	48·9	46·6	2·3
St. John's Wood	47·7	44·9	2·8
Manchester	45·	41·8	3·2
Alderley Edge	44·	40·6	3·4
Bowdon	44·5	41·2	3·3
York	43·5	40·9	2·6
December, 1852.			
Torquay	50·2	46·2	4·
Ventnor	50·4	47·8	2·6
Exeter	48·5	44·7	3·8
St. John's Wood	46·1	42·7	3·4
Manchester	45·2	41·3	3·9
Alderley Edge	44·5	40·3	4·2
Bowdon	45·	41·5	3·5
York	43·9	40·2	3·7
January, 1853.			
Torquay	44·9	39·7	5·2
Ventnor	45·6	41·4	4·2
Clifton	41·5	37·4	4·1
St. John's Wood	41·6	38·5	3·1
Manchester	40·6	37·	3·6
Alderley Edge	39·3	36·1	3·2
Bowdon	40·2	36·1	4·1
York	39·1	36·6	2·5
February, 1853.			
Torquay	35·7	27·5	8·2
Ventnor	36·7	32·3	4·4
Clifton	33·4	28·6	4·8
St. John's Wood	32·8	29·	3·8
Manchester	32·8	31·2	1·6
Alderley Edge	32·1	27·8	4·3
Bowdon	33·	29·3	3·7
Wakefield Prison	32·5	29·	3·5
March, 1853.			
Torquay	40·4	30·9	9·5
Ventnor	41·7	35·2	6·5

	Mean Temp.	Dew Point.	Difference.
March, 1853 (*continued*).			
Clifton	38·	32·	6·
St. John's Wood	37·4	33·9	3·5
Manchester	38·2	34·7	3·5
Alderley Edge	36·4	31·5	5·1
York	35·6	34·3	1·3
April, 1853.			
Torquay	48·8	38·7	10·1
Ventnor	48·4	44·4	4·
Clifton	45·3	40·	5·3
St. John's Wood, London	44·8	39·8	5·
Manchester	45·6	37·2	8·4
Alderley Edge	44·3	36·7	7·6
York	45·1	39·9	5·2
May, 1853.			
Torquay	52·7	45·5	7·2
Ventnor	54·2	48·9	5·3
Clifton	51·2	43·5	7·7
St. John's Wood, London	51·8	43·6	8·2
Manchester	51·6	40·5	11·1
Alderley Edge	49·9	40·2	9·7
Bowdon	52·	41·4	10·6
York	49·5	38·6	10·9
June, 1853.			
Torquay	58·	51·5	6·5
Ventnor	57·8	53·8	4·
Clifton	55 8	50·4	5·4
St. John's Wood	57·7	53·1	4·6
Manchester	58·6	48·7	9·9
Bowdon	57·8	49·9	7·9
York	56·5	52·4	4·1

COMPARATIVE TEMPERATURE OF SEVERAL PLACES

FOR ONE YEAR, FROM JUNE, 1853, TO JUNE, 1854.

(*Extracted from the Report of the Registrar-General.*)

Place.	Temperature of the Air at Torquay and other Places during the Quarter ending Sept. 30th, 1853, from the Report of the Registrar-General:					Humidity of the Air and Fall of Rain at Torquay and other Places during the Quarter ending Sept. 30th, 1853, from the Report of the Registrar-General:				
	Mean temperature.	Highest extreme.	Lowest extreme.	Mean daily range.	Quarterly range.	Days of rain.	Inches of rain.	Vapour in cubic foot of air.	Vapour required to saturate do.	Mean humidity.
								gr.	gr.	
Torquay, Woodfield	58·3	75·0	45·0	11·0	30	46	6·5	4·5	1·1	·80
Ventnor	59·4	77·0	46·0	8·8	31	42	7·9	5·1	0·7	·88
Clifton	56·6	76·5	39·4	14·9	37	49	12·6	4·5	0·8	·85
London, St. John's Wood	58·1	81·0	38·0	19·5	43	46	9·1	4·7	0·8	·85
Nottingham	56·7	79·0	33·5	17·7	45	38	9·3	4·1	1·2	·77
York	55·4	73·0	37·0	13·5	36	38	5·9	4·6	0·5	·90

COMPARATIVE TEMPERATURE OF SEVERAL PLACES.

(CONTINUED.)

(Extracted from the Report of the Registrar-General.)

Place.	Temperature of the Air at Torquay and other Places during the Quarter ending Dec. 31st, 1853, from the Report of the Registrar-General :					Humidity of the Air and Fall of Rain at Torquay and other Places during the Quarter ending Dec. 31st, 1853, from the Report of the Registrar-General :				
	Mean temperature.	Highest extreme.	Lowest extreme.	Mean daily range.	Quarterly range.	Days of rain.	Inches of rain.	Vapour in cubic foot of air. gr.	Vapour required to saturate do. gr.	Mean humidity.
Torquay, Woodfield	46·3	63·0	24·0	7·6	39	48	11·2	3·2	0·7	·83
Ventnor	46·8	62·0	24·0	7·6	38	43	8·6	3·5	0·5	·86
Clifton	42·0	62·5	10·7	11·1	51	49	7·4	3·0	0·3	·89
London, St. John's Wood	41·7	64·0	16·5	12·1	47	37	6·2	3·1	0·3	·92
Nottingham	40·7	65·2	13·8	12·8	51	44	6·5	3·1	0·4	·86
Alderley Edge	41·6	65·8	16·0	11·6	49	41	6·7	2·9	0·4	·87
Bowdon	42·1	63·0	12·0	12·7	51	—	6·5	2·9	0·4	·86
York	40·4	61·0	15·0	9·2	46	45	5·9	3·1	0·1	·96

COMPARATIVE TEMPERATURE OF SEVERAL PLACES.

(CONTINUED.)

(*Extracted from the Report of the Registrar-General.*)

Place.	Temperature of the Air at Torquay and other Places during the Quarter ending March 31st, 1854, from the Report of the Registrar-General:					Humidity of the Air and Fall of Rain at Torquay and other Places during the Quarter ending March 31st, 1854, from the Report of the Registrar-General:				
	Mean temperature.	Highest extreme.	Lowest extreme.	Mean daily range.	Quarterly range.	Days of rain.	Inches of rain.	Vapour in cubic foot of air.	Vapour required to saturate do.	Mean humidity.
								gr.	gr.	
Torquay, Woodfield	43·6	57·0	29·0	9·0	28	36	5·0	2·9	0·6	·81
Ventnor............................	43·7	59·0	28·0	9·0	31	40	4·4	2·9	0·6	·83
Clifton	40·7	63·3	15·0	11·9	45	35	4·9	2·8	0·4	·87
London, St. John's Wood	40·2	63·0	11·8	15·2	51	37	3·7	2·5	0·6	·82
Nottingham	40·0	64·3	4·0	15·7	68	34	4·2	2·6	0·5	·83
Alderley Edge	40·1	60·0	13·5	12·0	46	—	5·2	2·8	0·4	·88
Bowdon.............................	41·1	62·0	10·0	13·1	52	43	6·2	2·7	0·5	·86
Manchester	40·2	64·5	3·5	14·9	61	48	7·4	2·7	0·4	·88
York	38·9	61·0	3·0	11·1	64	22	3·3	2·7	0·3	·89

COMPARATIVE TEMPERATURE OF SEVERAL PLACES.

(CONTINUED.)

(*Extracted from the Report of the Registrar-General.*)

Place.	Temperature of the Air at Torquay and other Places during the Quarter ending June 30th, 1854, from the Report of the Registrar-General:					Humidity of the Air and Fall of Rain at Torquay and other Places during the Quarter ending June 30th, 1854, from the Report of the Registrar-General:				
	Mean temperature.	Highest extreme.	Lowest extreme.	Mean daily range.	Quarterly range.	Days of rain.	Inches of rain.	Vapour in cubic foot of air. gr.	Vapour required to saturate do. gr.	Mean humidity.
Torquay, Woodfield	51·4	72·0	36·0	12·7	36	39	5·1	3·4	1·1	·75
Ventnor	53·4	68·0	33·0	10·7	35	36	4·9	3·9	0·9	·80
Clifton	50·7	79·0	26·0	18·4	53	41	6·5	3·9	0·9	·79
London, St. John's Wood	51·7	77·4	29·0	20·1	48	42	5·2	3·3	1·2	·73
Nottingham	50·5	79·0	29·4	22·5	49	38	3·7	3·5	0 9	·80
Alderley Edge	50·7	75·8	26·5	18·8	49	39	4·4	3·3	1·1	·74
Manchester	52·5	77·0	29·0	21·3	48	40	4·1	3·2	1·5	·68
York	49·3	72·0	28·5	15·2	43	35	5·6	3·7	0·5	·88

METEOROLOGICAL JOURNAL

OF

TORQUAY

FOR EVERY DAY IN ONE YEAR,

FROM

JUNE 1854, TO JUNE 1855.

METEOROLOGICAL JOURNA

June.	Weather.	Wind.		9 a. Barom
		Point.	Force.	
1	Very fine … … …	N.E.	2	29·9
2	Light clouds and showers …	N.E.	3	— 8
3	Light clouds: fine … …	N.	3	— 9
4	Fine; light clouds …	N E.	5,2	30·0
5	Light clouds; fine … …	N E.	4	— 2
6	Ditto … … … …	N.E.	4,2	— 1
7	Fine . . … … …	N.	3	— 2
8	Ditto … … … …	N.	1	— 2
9	Cloudy; fine … … …	S.E., N.	1	— 1
10	Fine . . … . . …	N.W.	4,1	— 1
11	Cloudy; rain at night . .	S.W.	3	29·
12	Cloudy; fine and showers …	S.W.	3	—
13	Fine and showers … …	S.W.	5	—
14	Ditto; thunder in the evening	S.W.	3	—
15	Light clouds and showers …	S.W.	4	—
16	Sea fog; cloudy and showers	N.E.	2	—
17	Fine; light clouds and showers	N.W.	3	—
18	Fine; slight showers at night	S.W.	3	—
19	Fine … … . . …	S.W.	3	—
20	Ditto … … … …	S.W.	2	30·
21	Fine; drizzling rain; cloudy ..	S.	2	—
22	Cloudy; fine … . . …	S.W.	2	—
23	Light clouds; very fine …	S.W.	2	—
24	Fine … . . … …	S.W., E.	2	—
25	Fine; light clouds; rain at night	E.	2	—
26	Fine and showers … …	W.	4	29
27	Ditto … … … …	S.W.	4	—
28	Ditto … … … …	S.W.	3	—
29	Ditto … … … …	S.W.	3	—
30	Cloudy; fine; cloudy… …	N.W.	4	—
	Means … …	S.W.	3·1	29·

The temperature is registered at Cove House, Woodfield, and
field, the readings of the Baro

UAY, JUNE, 1854.

ghest iometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
65	65	51	51	51	58	49	...	5	4
56	57	49	49	48	53	47	·03	7	2
59	60	47	47	47	51	41	...	3	2
60	60	47	47	47	53	43	...	3	3
65	60	49	48	49	49	41	...	5	3
61	61	48	47	48	51	41	...	2	3
62	62	48	48	47	54	42	...	2	0
70	66	47	47	48	59	53	...	6	8
62	60	51	52	51	58	49	...	4	8
61	62	50	50	50	57	52	...	3	5
64	61	54	55	54	55	52	·53	7	8
60	60	52	52	51	57	54	·18	7	10
61	60	52	52	51	57	50	·11	8	6
62	60	52	54	53	59	47	·38	4	6
65	65	55	55	55	59	56	·08	1	1
66	64	53	54	53	58	55	·03	3	8
60	61	50	50	50	58	48	·04	8	8
65	62	52	52	52	59	50	·12	3	5
62	62	49	49	49	58	50	...	3	7
62	60	47	47	47	59	49	...	3	2
63	59	53	53	53	58	52	·05	5	5
70	67	54	54	54	63	56	...	0	2
69	69	54	55	55	63	53	...	1	2
68	65	51	56	57	68	54	. .	1	,,
72	59	55	56	55	65	59	·22	,,	,,
61	60	50	50	50	59	54	·03	4	5
62	58	49	49	48	55	47	·03	3	3
66	62	48	48	48	59	51	·02	6	6
60	57	53	53	53	57	50	·06	4	4
61	60	51	49	51	57	50	...	2	2
3·3	61·4	50·7	50·9	50 8	57·5	49·9	1·91	3·9	4·5

(C. H., W., P. P.) The other observations are taken at Wood reduced to the level of the sea.

METEOROLOGICAL JOURN

July	Weather.	Wind.		9 a. Barom
		Point.	Force.	
1	Light clouds; fine; showers at night	W.	2	30·0
2	Fine; hazy	S.W.	3	—0
3	Cloudy and showers	S.W.	3	—8
4	Fine and slight showers	S.W.	3	29·6
5	Ditto	S.W.	3	—6
6	Fine; cloudy	S.W.	3	—7
7	Cloudy; very fine	S.W., N.	2	—8
8	Very fine	N.E.	2	—8
9	Fine; sultry and slight showers ...	N.E.	1	—8
10	Light clouds; fine & thunder showers	S.E., W	2	—9
11	Light clouds; fine and showers ...	N.W., E.	1	—
12	Cloudy; fine and showers	E., W.	2	—
13	Very fine; light clouds	W.	2	30·
14	Cloudy and showers; fine evening...	W.	3	29·
15	Fine	W.	3	—
16	Fine; rain; fine	W.S.,W.	3	30·
17	Very fine; rain at night	S.E., W.	3	—
18	Ditto	W., S.E.	2	—
19	Showers; fine	S., W.	3	—
20	Very fine	S.E ,W.	2	—
21	Ditto	S.W.	2	—
22	Ditto	E.	1	—
23	Ditto	E.	1	—
24	Light clouds; very fine	E.	1	—
25	Very fine	N.E.	1	—
26	Cloudy and showers; dist. thunder	N.E.	2	—
27	Ditto	N.E.	2	—
28	Fine; light clouds	N.E.	3	—
29	Light clouds	N.E.	2	—
30	Cloudy; fine	W.	2	
31	Ditto	S.W.	3	
	Means	S. W.	2·2	...

The temperature is registered at Cove House, Woodfield, and
field, the readings of the Barom

QUAY, JULY, 1854.

ghest ometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
63	64	...	53	53	58	48	·01	3	2
65	62	54	55	54	60	58	·06	4	0
60	62	54	54	53	55	55	·11	3	4
62	63	52	52	52	60	52	·01	5	3
62	61	52	52	52	57	50	·01	4	5
63	61	51	52	52	55	47	·08	2	6
70	64	49	52	50	57	52	...	6	5
66	66	52	52	52	63	48	·15	1	3
63	61	53	53	53	60	52	...	3	4
67	63	55	54	55	62	57	...	2	4
67	66	52	52	52	61	54	·02	5	5
66	63	52	53	52	56	49	·01	3	6
67	67	55	55	55	61	51	...	3	3
63	60	54	54	54	60	51	...	3	1
68	66	52	53	52	61	51	...	3	0
67	66	54	55	55	63	55	·11	3	2
67	67	50	51	50	60	55	·36	1	3
69	66	56	56	56	63	54	...	5	8
67	68	50	52	51	60	57	·06	2	0
70	68	53	53	53	62	55	...	2	2
70	69	56	57	55	63	53	...	2	4
71	69	55	56	54	65	55	...	3	2
72	71	64	62	59	65	57	...	3	0
74	74	66	64	63	69	59	...	3	1
77	75	67	65	65	71	62	...	3	3
69	69	61	58	58	66	56	·28	2	3
65	66	60	59	58	61	58	·15	3	1
70	67	60	57	57	62	54	...	3	5
71	68	59	69	56	62	57	...	,,	,,
67	71	63	61	62	64	57	...	,,	,,
71	70	55	53	54	66	63	...	,,	,,
67·4	66·2	55·3	55·6	54·7	61·5	54·2	1·42	...	...

(C. H., W., P. P.) The other observations are taken at Wood-
reduced to the level of the sea.

METEOROLOGICAL JOURNA

Aug.	Weather.	Wind.		9 a.m Barome
		Point.	Force.	
1	Cloudy; showers; fine	s.w.	2	29·9
2	Cloudy; fine; cloudy	w.	1	—9
3	Fine; cloudy; showers	n.w.	3	30·0
4	Light clouds; fine	n.	1	—1
5	Fine	n.w.	2	—2
6	Heavy clouds; fair	n.e.	1	—2
7	Cloudy; fine; cloudy	n.w.	0	—0
8	Light clouds; hazy	n.e.	1	—2
9	Cloudy; fine with haze	n.w.	0	—1
10	Clouds and fine	n.w.	1	—1
11	Cloudy fine; slight showers ...	w.	1	—1
12	Cloudy	s.w.	2	—1
13	Cloudy; slight showers and fine ...	s.w., s.	1	—0
14	Cloudy; fair; slight showers ...	w.	2	—0
15	Cloudy; fine; cloudy	w.	1	—0
16	Cloudy; fine; showers	n.w.	1	—0
17	Ditto	s.w.	1	—2
18	Cloudy; fine	n.w.	0	—3
19	Fine and hazy	n.w.	1	—3
20	Fine	n.w.	1	—0
21	Cloudy; rain; fine	w., s w.	2	—0
22	Fine; cloudy; fine	s.w., w.	2	—0
23	Fine; cloudy; slight rain	w., s w.	3	—2
24	Fine; rather cloudy	w.	4	—2
25	Very fine	n.w.	2	—3
26	Ditto	e.	1	—4
27	Light clouds; very fine	e., n.w.	1	—5
28	Very fine	e.	1	—0
29	Ditto	n.	1	—5
30	Ditto	e.	1	—4
31	Ditto	n.e.	3	—2
	Means	n.w.	1·4	30·2

The temperature is registered at Cove House, Woodfield, and P
field, the readings of the Barome

QUAY, AUGUST, 1854.

ighest mometer.		Lowest Thermometer.			9 a. m. Therm.	9 a. m. Dew Point.	Rain in Inches.	Ozonometer.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
67	67	52	51	50	61	54	...	2	1
68	68	58	54	56	63	54	...	0	3
66	64	56	55	53	60	56	...	0	0
67	65	56	55	55	61	53	...	0	1
67	67	58	51	56	63	54	...	0	2
69	67	58	53	54	62	54	...	0	0
70	68	56	54	53	64	61	...	0	1
70	69	59	56	56	63	58	...	0	0
69	69	59	56	56	65	60	...	0	0
68	67	57	55	55	64	56	...	0	0
67	67	59	61	59	59	56	...	2	7
67	66	60	60	60	63	58	...	0	4
70	69	56	55	55	64	61	...	1	6
67	67	53	50	50	58	...	...	2	7
64	62	51	55	49	57	55	...	0	1
63	63	55	54	59	59	52	...	2	1
65	66	51	60	59	56	54	...	0	0
67	65	54	52	56	60	55	...	0	0
69	70	59	58	56	64	57	...	0	4
67	70	61	59	59	65	59	...	5	1
67	67	56	55	55	64	59	...	,,	,,
66	66	55	53	53	64	52	...	,,	,,
65	64	59	59	58	61	52	...	,,	,,
67	67	55	52	54	63	54	...	,,	4
66	68	55	54	53	62	51	...	4	4
71	68	59	58	58	62	52	...	2	2
74	71	60	58	58	65	60	...	4	0
75	73	61	61	59	68	55	...	3	0
76	73	61	58	56	69	59	...	0	0
71	70	61	59	58	66	57	...	2	0
70	71	63	60	60	66	59	...	1	1
68·2	67·6	57·2	55·8	55·7	62·6	55·8	·25	1·4	2·3

(C. H., W., P.P.) The other observations are taken at Wood-
reduced to the level of the sea.

METEOROLOGICAL JOURNA

Sept.	Weather.	Wind.		9 a.m Baromet
		Point.	Force.	
1	Very fine	N.E.	2	30·2
2	Ditto	N.E.	3	— 4
3	Ditto	N.E.	1	— 4
4	Ditto	N.E.	1	— 5
5	Ditto	N.E.	3,1	— 5
6	Ditto	N.E.	3,1	— 5
7	Ditto	N.E.	2	— 3
8	Cloudy; very fine	N.E.	3	— 3
9	Fine	N.E.	3	— 2
10	Very fine	N E.	2	— 3
11	Ditto	N.E.	2	— 3
12	Very fine; cloudy; showers at night	E.,SW.	1	— 0
13	Very fine; rain; fine night ...	S.W.	3	— 0
14	Light clouds; rain	S.W.	3	29·9
15	Fine and shower	S.W.	2	30·0
16	Ditto	S.W.	3	— 0
17	Very fine	S.W.	2	29·9
18	Fine; cloudy; rain at night ...	S.W.	4	30·2
19	Light rain	S.W.	4	— -
20	Misty showers; fair	S.W.	2	— -
21	Ditto	N.,NW.	1	— -
22	Very fine	N.W.	1	— -
23	Cloudy; fine	N.W.	0	— -
24	Fine; light cloudy; slight rain ...	W.	1	— -
25	Fine; very slight rain; fine ...	N.W.	0	— -
26	Very fine	E.,NE.	1	— -
27	Ditto	N.E.	0	— -
28	Ditto	N.E.	1	— -
29	Ditto	N.E.	1	— -
30	Ditto	E.	,,	— -
	Means...........	N.	2·0	— -

The temperature is registered at Cove House, Woodfield, and P
field, the readings of the Barome

QUAY, SEPTEMBER, 1854.

ighest mometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
68	67	60	58	51	62	52	...	2	0
65	66	57	56	52	61	57	...	1	1
70	68	56	52	51	63	51	...	2	0
74	71	60	59	58	66	54	...	2	1
69	68	60	58	58	64	54	...	4	0
66	67	53	55	54	59	54	...	3	0
66	67	60	59	58	63	55	...	4	1
65	64	58	55	55	59	52	...	3	2
65	63	59	55	54	60	50	...	3	0
68	65	59	56	54	62	52	...	2	2
65	63	56	54	52	63	58	...	4	4
68	67	60	60	53	63	58	·36	6	6
68	66	58	59	58	58	57	·13	6	8
64	62	55	55	54	63	58	·11	7	4
66	62	60	61	58	63	61	·10	5	4
68	67	60	60	59	65	62	·24	5	5
66	66	54	52	53	62	55	...	2	9
64	63	59	60	56	61	51	·05	5	5
65	65	60	60	60	64	62	...	,,	,,
65	65	52	48	48	64	60	...	,,	,,
61	60	50	47	45	56	49	...	,,	,,
61	60	54	53	50	56	51	...	,,	,,
63	63	55	54	54	60	51	...	,,	,,
64	64	50	56	48	60	52	...	,,	,,
61	60	49	45	46	57	43	..	,,	,,
61	59	55	55	48	57	50	...	,,	,,
62	61	57	56	53	59	54	...	,,	,,
63	62	55	53	53	60	55	...	,,	,,
66	64	56	53	52	61	52	...	,,	,,
67	64	55	53	51	67	55	...	,,	,,
66·9	64·3	56·4	55·5	53·2	61·5	53·3	1·10	,,	,,

e (C. H., W , P. P.) The other observations are taken at Wood-
g reduced to the level of the sea.

METEOROLOGICAL JOURNA

October.	Weather.	Wind.		9 a.m Barome
		Point.	Force.	
1	Fine	S.E.	1	...
2	Ditto	S.E.	2	...
3	Slight showers; very fine ...	W.	2	...
4	Drizzling rain; fine	N.E,W.	1	29·9
5	Fine and showers	S.W.	4	—8
6	Rain; cloudy	N.E.	1 3	—6
7	Cloudy and showers	N.E.	4	—9
8	Cloudy; thunder storm at night	N.E.	2	—9
9	Very fine	W.	2	...
10	Fine; cloudy and showers ...	S.W.	3	30·2
11	Fine	W.	4	—2
12	Very fine	N.	2	—6
13	Hazy; very fine; light clouds	W.	1	—5
14	Light clouds	S.W.	1	—4
15	Cloudy and slight showers ...	S.W.	2	—
16	Fine; cloudy and showers ...	S.W.	2	—1
17	Light clouds	N.	3	29·
18	Cloudy; fine and showers ...	N.	2	...
19	Fine; cloudy	S.E,W.	2	—
20	Fine and slight showers ...	W.	3	—
21	Fine; cloudy and showers ...	W.	2	—
22	Fine	W.	4	—
23	Fine & showers; distant thunder	W.	3	—
24	Very fine; heavy rain	W,N.E.	2	—
25	Rain; cloudy	N.	4	—
26	Fine; slight showers	N.W.	5	—
27	Very fine (w. frost); stormy night	N.	2	30·
28	Cloudy; fine	S.E,W.	4	—
29	Drizzling rain; cloudy; fine night	S.W.	3	—
30	Very fine	S.W.	2	—
31	Fine and showers	S.W.	2	—
	Means.......... ..	S.W.	2·5	—

The temperature is registered at Cove House, Woodfield, and P
field, the readings of the Barom

QUAY, OCTOBER, 1854.

ghest nometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
67	61	51	53	46	67	50	...	,,	,,
64	61	52	48	49	60	54	...	,,	,,
63	62	51	47	48	60	55	...	,,	,,
63	62	57	52	51	51	51	...	,,	,,
64	63	55	54	53	62	57	...	,,	,,
56	56	51	50	49	56	52	...	,,	,,
59	55	54	53	50	52	46	...	,,	,,
60	59	57	55	56	56	54	...	,,	,,
66	64	53	50	51	60	58	...	,,	,,
63	61	53	53	51	60	53	...	,,	,,
57	56	47	45	44	55	46	...	,,	,,
56	53	45	41	41	50	44	...	,,	,,
57	52	50	47	45	51	45	...	,,	,,
58	57	53	52	51	55	49	...	,,	,,
59	58	47	45	45	55	50	...	,,	,,
53	52	45	44	44	52	42	. .	,,	,,
51	48	45	40	44	46	40	...	,,	,,
49	49	39	45	37	49	47	..	,,	,,
55	52	47	46	46	45	39	...	,,	,,
...	54	47	...	45	53	42	...	,,	,,
56	56	50	50	49	52	42	...	,,	,,
54	55	46	45	45	55	41	...	,,	,,
53	51	42	41	41	49	41	...	,,	,,
53	50	45	44	42	47	41	...	,,	7
49	45	42	40	40	45	43	...	5	5
51	50	39	37	36	49	41	...	0	0
55	53	52	51	38	47	41	...	2	3
59	57	52	50	50	56	51	...	6	5
59	54	51	51	50	54	52	...	5	5
59	57	55	54	53	55	54	...	3	6
60	58	47	57	41	56	55	...	1	1
7·5	5·55	19·0	47·7	46 2	53·4	47·6	2·58	,,	,,

(C. H., W., P.P.) The other observations are taken at Wood-
reduced to the level of the sea.

METEOROLOGICAL JOURNA

November.	Weather.	Wind.		9 a.m Barome
		Point.	Force.	
1	Fine	S.W.	1	30·4
2	Cloudy	S.	1	— 4
3	Fine	N.W.	3	— 4
4	Hazy; cloudy	W.	1	— 4
5	Fine; light clouds	N.	3	— 2
6	Very fine	N.	2	— 5
7	Ditto	N.W.	1	—
8	Fine; light clouds	W.	2	— 4
9	Very fine	N.E.	5	—
10	Ditto	N.	3	—
11	Fine and slight showers ...	W.	4	—
12	Misty; cloudy	N.E.	1	—
13	Rain; cloudy; heavy rain ...	S.	3	—
14	Fine; rain at night	N.W.	2,5	29·
15	Fine and showers; cloudy; rain	S.E,N.	3	—
16	Foggy; very fine	N.	1	30·
17	Very fine (w. frost); cloudy & fog	N.	4	29·
18	Cloudy	N.	3	—
19	Cloudy; fine	N.	4	30·
20	Fine; cloudy	N.	4	—
21	Light clouds	N.W.	3	
22	Fine	N.W.	3	
23	Very fine	N.	3	
24	Fine; light clouds	N.E.	3	
25	Ditto	N.E.	3	
26	Very fine	N.E.	3	
27	Fine; cloudy	N.E.	2	
28	Cloudy	W.	2	—
29	Cloudy and showers	W.	2	—
30	Cloudy	W.	3	—
	Means............	N.	2·7	»

The temperature is registered at Cove House, Woodfield, and F
field, the readings of the Barom

QUAY, NOVEMBER, 1854.

ghest nometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
58	55	52	54	47	52	50	...	2	3
58	56	47	46	45	55	55	...	2	8
51	50	42	41	40	47	39	...	3	0
56	53	50	43	42	48	40	...	5	4
...	56	45	...	44	55	50	...	7	1
50	49	41	38	38	48	40	...	1	0
51	48	43	43	40	47	46	...	1	3
52	52	41	41	41	50	44	...	4	5
43	42	35	33	33	41	31	...	2	,,
52	50	44	36	38	42	35	...	5	3
55	54	47	47	47	52	46	...	4	4
48	47	44	44	43	45	43	...	0	0
50	49	42	41	41	48	47	...	8	2
50	49	42	41	40	44	40	...	6	7
48	47	39	38	37	46	40	...	6	5
47	44	36	34	33	40	40	. .	1	0
44	42	39	39	34	42	38	. .	5	4
44	42	40	41	35	43	35	...	5	5
43	42	38	39	38	42	34	. .	5	4
42	41	37	36	36	41	31	...	6	1
48	47	39	39	39	40	33	...	7	3
43	42	32	31	30	40	43	...	0	0
41	39	34	35	34	34	29	. .	2	2
45	39	34	34	34	38	33	...	,,	,,
44	38	32	33	32	36	34	...	,,	,,
38	37	30	30	28	35	28	...	,,	,,
43	42	32	30	27	30	28	...	,,	,,
51	50	45	43	39	42	38	...	,,	,,
50	49	40	39	38	43	41	...	,,	,,
51	50	41	42	40	44	43	...	,,	,,
3·1	46·7	40·1	39·0	37·7	4·36	38·8	3·17	,,	,,

(C. H., W., P.P.) The other observations are taken at Wood-
reduced to the level of the sea.

METEOROLOGICAL JOURN

December.	Weather.	Wind.		9 a. Barom
		Point.	Force.	
1	Fine	W.	2	—
2	Fine and showers	W.	3	—
3	Cloudy	N.W.	3	30·
4	Very fine	N.W.	3	—
5	Rain; fine and showers ...	S.W.	5	29·
6	Light clouds; fine	W.	3	—
7	Very fine; light clouds ...	W.	3	—
8	Fine and slight showers ...	N.W.	4	30·
9	Very fine	N.E.	3	29·
10	Light clouds; fine and showers	S.E.	1	30·
11	Fine; cloudy and showers ...	W.	3	—
12	Ditto; ditto	W.	3	30·
13	Light clouds; fine	S.W.	2	—
14	Ditto	S.W.	4	—
15	Ditto	S W.	5	—
16	Very fine; slight showers ...	W.	5	—
17	Fine; light clouds and showers	W.	3	—
18	Fine and showers	W.	5	29
19	Light clouds; fine and showers	S.W.	2	—
20	Fine and showers	N.	5	—
21	Cloudy and showers	W.	2	30
22	Fine; cloudy	W.	3	—
23	Light clouds and showers ...	W.	3	—
24	Fine; cloudy	W.	3	—
25	Rain; fine and showers ...	S.W.	5	29
26	Very fine; cloudy	W.	4	30
27	Fine and showers	W.	4	—
28	Very fine	W.	2	—
29	Fine and showers	W.	2	—
30	Cloudy	W.	3	—
31	Ditto	S.W.	2	—
	Means	W.	3·2	

The temperature is registered at Cove House, Woodfield, and
field, the readings of the Baro

QUAY, DECEMBER, 1854.

ighest mometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	Ozonometer.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
53	46	39	39	37	45	37	...	,,	,,
50	49	44	43	42	45	41	...	,,	,,
51	50	46	46	45	49	43	...	,,	,,
42	49	46	51	45	49	39	...	,,	,,
50	49	40	40	39	50	46	...	7	6
45	44	38	38	37	40	34	...	7	6
49	46	39	37	36	42	33	...	0	6
51	50	43	43	43	48	46	...	3	7
45	45	36	36	35	44	35	...	4	4
40	39	31	30	29	38	28	...	0	0
47	46	37	37	33	37	35	...	4	3
49	48	43	43	41	42	35	...	3	5
53	50	49	49	49	48	46	...	7	10
54	54	50	51	49	53	47	...	5	6
52	52	48	47	48	52	50	...	5	4
49	48	39	38	38	48	38	...	6	4
50	48	41	39	40	43	37	...	4	5
47	49	37	37	35	47	...	...	,,	,,
47	47	40	41	38	39	31	...	,,	,,
47	46	39	39	36	43	34	...	1	3
51	51	48	45	40	44	40	...	4	6
53	53	50	51	50	50	44	...	,,	0
54	53	46	46	45	52	48	..	2	3
51	50	48	48	47	48	42	...	6	8
52	52	42	41	40	51	51	...	6	5
45	45	38	38	37	44	35	...	3	8
43	40	33	32	31	40	38	...	8	5
43	38	34	32	30	35	28	...	0	0
46	44	39	40	38	42	38	...	1	6
47	46	39	39	37	43	39	...	1	0
50	48	44	47	42	43	39	...	5	,,
8·5	47·5	41·5	41·4	39 7	44·9	39·2	1·07	,,	,,

(C. H., W., P. P.) The other observations are taken at Wood-
reduced to the level of the sea.

METEOROLOGICAL JOURNA

January.	Weather.	Wind.		9 a.m Baromet
		Point.	Force.	
1	Fine; cloudy	W.	5,2	30·2
2	Ditto	W.	5,2	— 3
3	Very fine	W.	1	— 3
4	Very fine; cloudy and showers	S.W.	2	— 3
5	Fine and showers	S.W.	4	— 2
6	Fine; cloudy	S.W.	2	— 4
7	Cloudy...	S.W.	1	— 6
8	Ditto	S.W.	1	— 5
9	Ditto	S.	1	— 5
10	Cloudy; fog; rain	N.E.	1	— 6
11	Ditto	N.E.	1	— 6
12	Ditto	N.E.	2	— 6
13	Ditto	N.E.	4	— 6
14	Cloudy; fine	N.E.	1	— 5
15	Light clouds; fine	N.	1	— 5
16	Fine	N.	1	— 2
17	Fine; slight snow showers ...	N.E.	3	— 1
18	Fine	N.E.	5	— 1
19	Fine; snow 1½ inch ...	N.E.	3	— 0
20	Cloudy; fine	N.E.	3	29·9
21	Ditto; ditto	N.E.	3	— 9
22	Ditto; ditto	W.	2	— 9
23	Fine; cloudy	N.	2	— 9
24	Cloudy; fine	N.E.	2	30·1
25	Cloudy; fine (white frost) ...	N.E.	2	— 1
26	Ditto; ditto ...	N.E.	2	— 1
27	Cloudy; fine	N.E.	2	29·9
28	Fine	N.E.	2	30·0
29	Fine; snowing (1 inch) ...	N.E.	2	29·9
30	Cloudy and snow showers ...	N.E.	3	— 1
31	Ditto (5 inches)	N.E.	4	— 4
	Means	N.	2·3	30·1

The temperature is registered at Cove House, Woodfield, and Pa
field, the readings of the Baromet

QUAY, JANUARY, 1855.

ighest rmometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	Ozonometer.	
W.	P. P.	C. H.	W.	P. P.				Day.	Night.
50	50	48	48	47	50	42	...	5	6
52	51	43	43	42	50	43	...	3	2
49	48	40	40	39	45	42	...	0	0
47	46	43	42	40	42	38	...	3	10
48	48	45	46	44	46	42	...	3	6
51	49	47	47	45	48	42	...	0	2
50	49	46	46	45	48	40	...	2	2
48	47	45	45	44	47	41	...	1	0
49	48	45	46	44	47	40	...	0	0
49	46	43	43	42	46	44	...	1	2
45	44	41	42	40	44	37	...	0	5
43	42	40	40	39	43	41	...	1	7
40	40	39	38	38	40	33	...	5	8
41	40	37	36	35	40	33	...	3	3
39	38	34	34	34	37	30	...	0	0
41	40	29	29	28	37	32	...	3	4
32	32	27	28	26	31	23	...	5	3
35	31	30	28	29	30	28	...	1	0
35	33	27	27	25	34	28	...	2	6
35	33	31	29	30	29	27	...	1	2
34	33	29	28	28	35	30	..	1	0
41	39	30	30	29	35	30	...	0	0
39	37	29	29	28	36	31	...	1	0
39	33	30	29	29	34	26	..	0	1
39	36	29	28	28	34	29	...	0	0
39	37	32	32	29	35	26	...	0	1
38	37	29	29	28	38	31	...	2	1
36	36	33	28	28	32	29	...	0	1
36	35	32	31	30	34	29	...	2	3
36	35	29	29	27	33	29	...	4	5
32	31	28	29	27	30	...	...	2	1
41·5	40·1	35·7	35·4	34·4	39·0	38·8	2·00	1·6	2·6

e (C. H., W., P.P.) The other observations are taken at Wood-
g reduced to the level of the sea.

METEOROLOGICAL JOURN

February.	Weather.	Wind.		9 a. Barom
		Point.	Force.	
1	Cloudy...	N.E.	2	29·
2	Ditto; rain at night	N.E.	5	—
3	Cloudy and showers	S.E.	3	—
4	Fine; showers	S.	2	—
5	Cloudy	N.	2	—
6	Snow showers...	N.E.	2	—
7	Cloudy...	N.E.	4	—
8	Fine; snow; rain at night ...	N.E.	4	—
9	Cloudy...	N.E.	4	—
10	Ditto	N.E.	4	—
11	Fine	N.E.	3	—
12	Cloudy	N.E.	3	—
13	Fine; cloudy	N.E.	4	—
14	Very fine	N.	2	—
15	Fine	N.	1	—
16	Cloudy...	E.	5	—
17	Ditto	N.E.	4	—
18	Light clouds; fine	N.E.	4	30·
19	Ditto	N.E.	4	29·
20	Very fine	N.E.	1	30·
21	Cloudy; snow showers ...	N.E.	2	—
22	Cloudy and misty	N.E.	2	—
23	Cloudy and foggy; fair ...	N.W.	1	—
24	Misty; white frost; fine ...	N.W.	1	—
25	Cloudy; slight rain	S., W	1	29·
26	Cloudy and damp; fine ...	N.W.	1	—
27	Foggy; fine	S.W.	2	—
28	Ditto	N.W.	2	—
	Means	N.E.	2·6	29·

The temperature is registered at Cove House, Woodfield, and P
field, the readings of the Barome

RQUAY, FEBRUARY, 1855.

hermometer.	Highest Thermometer.		Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	OZONOMETER.	
t.	W.	P. P.	C. H.	W.	P. P.				Day.	Night.
	31	31	29	29	26	30	...	...	1	0
	42	28	30	30	27	29	...	...	2	5
	45	44	41	31	39	42	40	...	3	3
	47	46	39	39	36	43	41	...	1	0
	41	41	36	35	34	40	38	...	0	0
	37	35	35	34	30	35	30	...	3	5
	35	34	30	29	29	35	30	...	7	6
	39	30	31	29	29	29	...	...	,,	,,
	37	32	29	26	27	32	32	...	4	4
	31	29	24	22	22	27	...	...	5	5
	32	31	29	25	26	24	...	...	3	2
	33	32	28	26	26	31	25	...	3	3
	31	27	21	23	22	..	27	...	2	1
	32	32	22	21	19	..	30	...	2	2
	32	31	31	29	29	..	25	...	0	2
	25	32	24	18	22	..	32	...	,,	,,
	26	26	25	24	23	..	24	...	5	5
	30	29	28	26	27	..	26	...	3	2
	33	33	26	26	25	..	30	...	3	3
	33	33	28	26	25	27	..	...	,,	,,
	35	30	31	30	29	26	...	...	,,	,,
	40	35	35	35	31	33	...	...	,,	,,
	40	40	30	30	29	35	...	...	,,	,,
	47	39	40	41	38	29	...	...	,,	,,
	48	48	42	42	40	44	...	...	,,	,,
	48	48	38	37	36	43	...	...	,,	,,
	49	49	42	41	41	48	...	...	6	5
	51	48	41	45	39	44	..	...	2	9
2	37·5	35·4	31·6	30·2	29·9	,,	,,	1·32	,,	,,

ce (C. H., W., P. P.) The other observations are taken at Wood-
ng reduced to the level of the sea.

METEOROLOGICAL JOURNA

March.	Weather.	Wind.		9 a. m Baromet
		Point.	Force.	
1	Fine	N.W.	4	29·7
2	Rain ; fine evening	S., W.	3	— 3
3	Fine	N.W.	5	— 2
4	Fine ; showers at night ...	S.W.	2	— 2
5	Fine	N.	2	— 8
6	Very fine ; sea fog	N.E.	1	— 9
7	Fine	N.E.	1	— 7
8	Light clouds ; fine	N.E.	2	30·1
9	Fine	N.E.	1	— 1
10	Rain ; fine evening	E.	1	29·8
11	Fine ; showers	E.	2	— 8
12	Fine and showers	N.W.	4	— 2
13	Very fine	W.	2	— 4
14	Rain and fog	S.E.	1	— 6
15	Ditto	E.	1	— 8
16	Very fine	W.	2	— 7
17	Rain ; fine	E., W.	4	— ,,
18	Fine and showers	S., W.	3	— 8
19	Ditto	S.W.	3	30·0
20	Fine	E.	1	29·8
21	Rain	N.E.	3	— 2
22	Rain and snow showers ..	N.E.	4	28·9
23	Ditto (two inches)	N.E.	2	29·2
24	Snow showers ; cloudy ...	N.E.	4	— 2
25	Fine ; light clouds	N.E.	3	— 5
26	Ditto ; ditto	N.E.	3	— 7
27	Fine	N.E	2	— 9
28	Very fine	N.W.	2	30·1
29	Cloudy	N.E.	3	— 4
30	Very fine	N.	2	— 5
31	Light clouds	N.E.	2	— 4
	Means	N.E.	2·4	29·7

The temperature is registered at Cove House, Woodfield, and Par
field, the readings of the Baromet

ORQUAY, MARCH, 1855.

Highest Thermometer.			Lowest Thermometer.			9 a. m. Therm.	9 a. m. Dew Point.	Rain in Inches.	Ozonometer.	
H.	W.	P. P.	C. H.	W.	P. P.				Day.	Night.
	50	50	43	44	43	40	41	...	7	10
	49	50	42	42	41	48	46	...	6	8
	47	45	36	37	34	44	37	...	2	5
	48	47	41	41	39	45	41	...	3	2
	45	45	36	33	33	43	39	...	2	4
	44	41	39	37	37	38	36	...	6	9
	45	44	34	32	32	42	40	...	5	6
	40	40	34	32	31	34	32	...	0	1
	44	41	35	34	34	38	28	...	2	7
	41	39	35	35	34	38	36	...	,,	,,
	45	42	38	38	35	40	33	...	4	6
	46	45	39	39	38	41	32	...	1	3
	46	46	39	39	38	44	33	...	2	3
	45	44	42	41	40	41	39	...	4	6
	47	46	41	41	40	43	41	...	8	5
	51	49	44	44	44	46	40	...	6	9
	49	47	38	38	37	45	41	...	5	6
	50	49	44	44	42	46	36	...	6	8
	52	51	41	42	39	47	45	...	4	6
	48	46	42	41	40	47	43	...	,,	,,
	42	41	36	34	34	40	38	...	,,	,,
	37	37	35	32	32	35	33	...	5	4
	36	36	34	32	32	32	26	...	4	3
	35	36	32	30	30	33	28	...	3	3
	41	40	35	34	34	35	26	...	2	4
	43	42	36	37	35	38	26	...	3	2
	47	46	36	36	34	43	32	...	4	3
	43	42	38	37	36	39	32	...	,,	,,
	38	39	32	32	29	38	31	...	,,	3
	43	43	31	34	32	38	29	...	2	2
	44	43	33	34	30	40	31	...	2	4
9	44·5	43·6	38·5	36·9	35·8	40·9	35·0	2·88	3·1	4·3

ice (C. H., W., P. P.) The other observations are taken at Wood-
ng reduced to the level of the sea.

METEOROLOGICAL JOURN

April.	Weather.	Wind.		9 a.n Barom
		Point.	Force.	
1	Very fine	N.E.	1	30·3
2	Fine; light clouds; rain at night	E.	2	— 1
3	Fine; cloudy	N.W.	2	29·6
4	Light clouds; fine	N.	2	— 6
5	Fine	N.W.	1	30·1
6	Very fine; light clouds ...	S.W.	1	— 2
7	Very fine	W.	2	— 2
8	Fine	S.W.	3	— 2
9	Cloudy and showers; fine ...	S.W.	3	— 0
10	Fine and showers	N.W.	5	29·6
11	Fine; cloudy and showers ...	W.	4	— 7
12	Fine; cloudy; rain at night ...	W. & S.	3	— 7
13	Cloudy and showers; fine ...	E. & S.	1	— 5
14	Fine; slight showers	S.E.	1	— 9
15	Very fine	N.W.	1	30·3
16	Hazy; very fine	N.W.	2	— 3
17	Very fine	N.E.	2	— 3
18	Ditto	E.	3	— 3
19	Ditto	E.	2	— 2
20	Fine	E.	3	— 2
21	Very fine	N.E.	4	— 5
22	Cloudy...	N.E.	4	— 5
23	Very fine	E.	3	— 5
24	Ditto	W. & E.	2	— 5
25	Ditto	E.,N.W.	1	— 3
26	Cloudy; fine	N.E.	2	— 3
27	Hazy; very fine	N.	1	— 3
28	Fine	E.	2	— 2
29	Cloudy; fine	N.E.	3	— 3
30	Cloudy...	E.	2	— 2
	Means	E.	2·6	30·

The temperature is registered at Cove House, Woodfield, and P
field, the readings of the Barom

RQUAY, APRIL, 1855.

Highest hermometer.			Lowest Thermometer.			9 a.m. Therm.	9 a.m. Dew Point.	Rain in Inches.	Ozonometer.	
I.	W.	P. P.	C. H.	W.	P. P.				Day.	Night.
	44	42	32	29	28	38	31	...	1	1
	46	45	40	39	39	40	36	...	3	8
	45	44	37	37	35	45	41	...	2	1
	48	48	39	37	36	41	35	...	0	1
	54	53	45	46	43	44	40	...	3	6
	57	54	46	46	43	51	45	...	4	5
	53	53	43	42	41	51	41	...	3	4
	50	51	44	45	43	45	37	...	3	4
	51	53	45	45	44	50	46	...	6	7
	48	50	42	43	41	48	42	...	4	3
	50	51	46	46	45	48	42	...	5	4
	53	54	45	47	45	49	45	. .	7	9
	55	55	41	40	39	49	41	...	5	4
	55	54	43	42	43	50	44	...	1	4
	56	56	46	43	41	50	44	...	5	6
	60	57	46	48	44	50	46	...	4	2
	61	60	46	48	44	52	42	...	7	6
	58	53	43	40	40	48	42	...	4	6
	56	55	48	45	44	47	45	...	3	4
	57	56	44	41	41	48	41	...	4	6
	49	48	42	38	39	44	44	...	4	3
	47	47	41	39	38	41	44	...	7	5
	50	48	41	41	36	44	46	...	4	6
	63	62	47	42	45	48	33	...	5	4
	60	58	44	42	42	52	36	...	7	9
	49	50	39	36	35	44	33	. .	6	4
	56	55	43	41	40	47	34	...	7	10
	57	56	45	42	42	50	32	...	4	3
	49	50	43	42	41	43	30	...	3	2
	41	53	43	40	40	44	38	...	2	6
	56·8	5 2·3	46·9	41·2	40 5	48·6	40·6	·25	4·3	4·7

e (C. H., W., P. P.) The other observations are taken at Wood-
g reduced to the level of the sea.